CAMBRIDGE SYSTEMATICS

Regional Freight System Planning Recommendations Study

Draft Data Synthesis and Analysis Technical Memorandum

technical

memorandum

prepared for

Chicago Metropolitan Agency for Planning (CMAP)

prepared by

Cambridge Systematics, Inc.

Revised December 2,2009

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115 South LaSalle, Suite 2200
Chicago, Illinois 60603

date

September 15, 2009
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1.0 Introduction

Greater Chicago historically has played a major role as a freight hub within the U.S., and the built environment of the region is reflective of this history. In turn, a robust industrial and distribution economy has grown up in the region. However, dramatic increases in passenger vehicle miles traveled over the past several decades have presented substantial challenges to maintaining a system that serves freight transportation needs with a high level of service. Freight and passenger traffic frequently compete for the same transportation supply, whether it is direct competition (e.g., on roadways) or indirect competition (e.g., at rail crossings). As a result, freight operators in the Chicago region face transportation system deficiencies in order to conduct business. This has presented a challenge to the Chicago region's economy.

This technical memorandum is the starting point to understanding the infrastructure, operational and policy deficiencies facing greater Chicago's freight system and the conflicts between the freight system and passenger travel. The memorandum will also explore the relationship between the freight system and the communities within which it operates. To accomplish this, this technical memorandum contains two distinct sections:

- **Section 2 – Data Collection and Synthesis** contains a synthesis of existing conditions data obtained on the greater Chicago freight transportation system; and
- **Section 3 – Data Analysis** contains a first cut, high-level analysis of the existing conditions data using visual inspection to determine greater Chicago's freight transportation system needs and deficiencies.

Results contained within this memorandum will be updated and augmented in the final report as stakeholder interviews are conducted and Transearch data is examined.

2.0 Data Collection and Synthesis

Cambridge Systematics, with assistance from the Chicago Metropolitan Agency for Planning (CMAP), undertook a data collection effort as part of Task 2 of the Regional Freight System Planning Recommendations Study. As new data collection was not part of the scope of this project, the focus of the data collection effort was on obtaining the most recent, accurate and comprehensive data available from a wide variety of existing sources that represent all modes of freight transport. Data were obtained from the following agencies and organizations, and are described in detail in Table 2.1:

- Center for Freight and Infrastructure Research and Education (CFIRE);
- Chicago Department of Transportation (CDOT);
- Chicago Metropolitan Agency for Planning (CMAP);
- Chicago Region Environmental and Transportation Efficiency Program (CREATE);
- Federal Aviation Administration (FAA);
- Federal Railroad Administration (FRA);
- Illinois Department of Transportation (IDOT);
- Illinois Institute of Technology (IIT);
- Metropolis 2020 (M2020); and
- United States Army Corps of Engineers (USACE).

While extensive data was found to be collected and used by the public sector, the majority of freight systems are operated by the private sector and the ability to receive hard-copy private sector data for public study is always a challenge. Railroads', trucking companies', shippers' and others' interests lie in protecting their bottom line and not disseminating information that may benefit their competitors. As supplement to this hard-copy data collection effort, anecdotal information collected during stakeholder interviews with private sector owners, operators, and users will supplement public sector data received to ensure a complete picture of the greater Chicago freight transportation system is presented in this study. In particular, assessment of aviation system needs and deficiencies will be enhanced. Stakeholder interview information will be published as an addendum to this report.

Initial inspection of the available data revealed some opportunities for unique analyses as well as some data gaps that could pose challenges for the project.

Opportunities

- **Freight Infrastructure Data:** The extent of freight infrastructure information will provide a solid base to aid the study team in analysis.
- **Illinois Roadway Information System (IRIS) Data:** IRIS roadway data from CMAP will support analysis of roadway delays and potential congestion impacts of various policy recommendations including trade-off analyses between freight and passenger operations and investments.
- **Truck Parking Data:** Truck parking inventory is traditionally a challenging area for data collection but recent studies from the Illinois Institute of Technology (IIT) and the Center for Freight and Infrastructure Research and Education (CFIRE) have improved data availability for the Chicago region.
- **Business Location Data:** The extent of business location data provides a unique data layer to help reflect private sector decision making in site selection and operations.

Challenges

- **Private Sector Data:** The freight system has been developed and is used primarily for private sector business, and as such, there are a variety of private sector data that drive business decisions (e.g. what, when and where improvements are made to railroad infrastructure). This information is closely guarded by private sector parties and most will be unavailable for use in this study.
- **Drayage Data:** Limited data was found for drayage volumes so overall truck traffic volumes will have to be relied upon, making isolation of the drayage market difficult.
- **Prohibited Truck Routes Data**: Comprehensive sources for truck-prohibited routes were not located.

Table 2.1 Data Collection Matrix

Name	Source	Data Format	Brief Description	Coverage	Important Data Fields
Airport Cargo by Value	FAA	Spreadsheet	Cargo by value	Top U.S. Airports	Total cargo by value
Airport Cargo Volumes	CMAP	Spreadsheet	Domestic and international cargo tonnage	O'Hare and Midway	Domestic/international cargo tons
CDOT Downtown Freight Study	CDOT	Report	Study of truck delivery issues in CBD	CBD	Loading facility inventory, recommendations for improvement
Chicago Waterways Commodity Flows	CMAP	Spreadsheet	Tons by commodity (2006)	Chicago Port, Illinois River	Tons by commodity type
City of Chicago Zoning	CMAP	Shapefile	2005 zoning designations	City of Chicago	Zoning designations and classes, area
CMAP Model Network	CMAP	Shapefile	E+C model network (2010 and 2030)	CMAP region	Truck-prohibited lanes (limited), toll locations, signal interconnect locations
Construction Schedule	CDOT	Report	All construction projects (300-page document)	City of Chicago	Project name, description, location, cost
Construction Schedule (Roads/Spots/ Structure)	IDOT	Shapefile	Planned roadway improvements	Statewide	Location, class, cost, years to complete, description of improvement, funding source
Container Terminals	CMAP	Shapefile	Container yards	CMAP region	Name, location, primary rail owner, type (depot versus ramp), address
CREATE Corridors and Projects	CREATE	Shapefile	CREATE project locations and corridors	CMAP region	Location, project type, can get estimates and benefit-cost findings from Stimulus Application
Designated Industrial Corridors	CMAP	Shapefile	Location of City of Chicago Industrial Corridors	City of Chicago	Name of corridor, area in acres/square miles
Freight Businesses	CMAP	Shapefile	Businesses in the region that move freight	CMAP region	NAICS, employment, sales volume

Table 2.1 Data Collection Matrix (continued)

Name	Source	Data Format	Brief Description	Coverage	Important Data Fields
Intermodal Locations	CMAP	Shapefile	Location of intermodal facilities	CMAP region	Name of rail company (primary owner), address, can be linked with lift volumes
IRIS Roadway Data	CMAP	Shapefile	Detailed roadway information	CMAP region	Road name, ADT, HCV (and MU volume), functional class, lanes, county
IRIS Travel Time Index/ Other Operational Data	CMAP	Spreadsheet	Detailed roadway information for link to shapefile	CMAP region	Midpoint pace speed – a.m. and p.m. peak, travel time index, speed percentiles
Land Use Survey	CMAP	Shapefile	Land use designations (2005)	CMAP region	Land use class (broken out by 50 classes), area
Lift Volumes	CMAP	Spreadsheet	Intermodal lift volumes	CMAP region	Annual lifts (2006 and 2000).
Lock Statistics	USACE	Shapefile	Volume and LOS data for locks	CMAP region	Average delay; average processing time; number of barges (empty and loaded), number of lockages, and number of vessels by category (commercial, noncommercial, recreational); tons locked by commodity type, unavailable times-both scheduled and unscheduled (number and duration of)
M2020 Freight Plan	M2020	Report	Data and recommendations	CMAP region	Freight recommendations
Municipality Boundaries	CMAP	Shapefile	Municipalities	CMAP region	Name and location

Table 2.1 Data Collection Matrix (continued)

Name	Source	Data Format	Brief Description	Coverage	Important Data Fields
Port and Waterway Characteristics	USACE	Spreadsheet	Port and waterway characteristics in CMAP area	CMAP region	Location fields, waterway, port name, purpose, railway connections, commodities handled, depth, berthing distance
Rail Crossings	IDOT/ FRA	Shapefile	All at-grade rail crossings from both IDOT and FRA	Illinois, national	IDOT: Crossing number, RR; FRA: Crossing number, RR, road fclass, AADT, signals, day thru, night thru, total trains/day, posted speed, safety info (predicted casualty and fatality rates)
Regional Rail Network	IDOT/ FRA	Shapefile	Railroads (from both IDOT and FRA)	Illinois, national	IDOT: location, owner, Metra-operated code; FRA: location, owners, all track rights, density code, signal system type
Socioeconomic Data	CMAP	Shapefile	SE data by subzone (QSEC)	CMAP region	Households and jobs by QSEC, 2010 and 2040 (Reinvest Scenario)
Structures	CMAP	Shapefile	Bridges from NBI	CMAP region	Roads, water crossing, owner, fclass, year built, ADT (various years), posting, operation code, truck ADT, future (2021) ADT
TRANSEARCH – Nonrail Modes	CMAP	Database	Truck, water, and air freight flows through CMAP region (base and future years)	Nationwide flows through CMAP region and intra-regional flows	Mode (truckload, less-than-truckload, private, NEC; Air; Water; Other; Pipeline), equipment (e.g., tanker), STCC, SIC, truck mapping tool (route name, lanes, functional class, truck tons), tons and value for air and water, regional entry and exit roads, origin and destination (Census region, BEA, Mexican state).

Table 2.1 Data Collection Matrix (continued)

Name	Source	Data Format	Brief Description	Coverage	Important Data Fields
TRANSEARCH – Rail	CMAP	Database	Rail freight flows through CMAP region (base and future years)	Nationwide flows through CMAP region and intra-regional flows	Origin and destination (Census region, BEA, Mexican state,), load (carload, intermodal, NEC), mapping tool (RRD owner, density, signal type, junction names), cars, tonnage, value, trade type (IB, through, etc.)
Transload Terminals	NTAD09	Shapefile	Terminals for transload	National	Facility name, primary mode, modes served, some commodity and shipment data
Transportation Firms	M2020	Shapefile	Businesses in transportation category	CMAP, some Indiana and Wisconsin	Company name, SIC, employee category
Truck Parking Dataset/Report	CFIRE	Report	Locations of truck parking deficiencies	Midwest	Maps of areas of truck parking shortage
Truck Parking Shapefile/ Report	IIT	Shapefile/Report	Location of truck parking lots	Southern end of CMAP region around I-80	Locations, municipality, parking spaces (not comprehensive)
Truck Routes	IDOT	Shapefile	Truck routes (Class I,II,III)	Statewide	Name, fclass, AADT (07-08), length, tolled, truck route class
Truck Volumes		Shapefile	Truck ADT (2002) from Freight Analysis Framework	National	Truck ADT (2002) by link
Vertical Clearance Deficiencies	M2020	Shapefile	Viaduct clearance locations in Chicago	Chicago	Location, viaduct owner (e.g., CTA)
Water Facility Events	USACE	Spreadsheet	List of events (collisions, etc.) at various facilities	Nationwide	Latitude/longitude, facility name, type of event, severity
Water Foreign Imports/ Exports	USACE	Spreadsheet	Year 2007 export tons	Nationwide	Year, port name, waterway, state, foreign port ID, tonnage, commodity code

Table 2.1 Data Collection Matrix (continued)

Name	Source	Data Format	Brief Description	Coverage	Important Data Fields
Water Lock Characteristics	USACE	Shapefile	Characteristics of CMAP area locks	CMAP (nationwide available)	Chamber L x W x D, Channel L x W x D, operator info
Waterborne Freight Volumes	USACE	Shapefile	Year 2006 tons by link and commodity	CMAP (nationwide available)	LinkID, link name, river name, total tons up/down, tons up/down by commodity (coal, petro, chem, crmat, manu, farm, mach, waste, unknown)
Waybill data	CMAP	Spreadsheet	Sample of rail cars and their movements (about three percent of all cars nationwide)	Nationwide	Carloads, revenue, tonnage, commodity type, U.S./Mexico/ Canada terminus, operator name, intermodal transfer info, short-line miles, transit charges, truck-for-rail substitutions, routing (line, state), physical car characteristics (axles, length, number of units, capacity, etc.), origin and destination (station, BEA, county, state, Census region), expansion factors, distance by railroad, distance traveled, freight rate area, grain inspection availability, auto ramp availability, water-rail movement, inter/intrastate

Abbreviations: AADT (Average Annual Daily Traffic), ADT (Average Daily Traffic), BEA (Bureau of Economic Analysis), CBD (Central Business District), HCV (Heavy Commercial Vehicles or Trucks), ID (Identification), IB (In Bound), LOS (Level of Service), LRS (Linear Referencing System), MU (Multi-Unit Truck), NAICS (North American Industry Classification System), NBI (National Bridge Inventory), NEC, NHPN (National Highway Planning Network), NTAD09 (National Transportation Atlas Database 2009), QSEC (Quarter Section), RRD (Railroad), SIC (Standard Inventory Code), STCC (Standard Transportation Commodity Code)

3.0 Data Analysis

As presented in Section 2, data were obtained from several sources in a number of formats (e.g. Shapefile, spreadsheet, database, etc.). It was essential to develop a common platform by which the data could be analyzed in combination with each other, and ultimately be used as a tool to determine greater Chicago's freight system needs and deficiencies. A shared GIS platform was designed to analyze the data, enabling a wide-variety of mode specific and multi-modal queries to be run.

Using the GIS tool, each of the four primary modes of freight transportation – trucking, rail, water, and air – was examined using a series of maps. Because of the presence of four modes and the role greater Chicago plays as a goods movement hub, intermodal connectivity was also stressed in the analysis. And due to the important link between transportation and development, land use adjacent to freight infrastructure was also reviewed. For each mode, the high-level discussion is structured as follows:

1. **Nationwide Analysis:** Freight flows or volumes are examined at the national level. The importance of greater Chicago to nationwide transport for each mode is demonstrated.
2. **Regional Analysis:** Freight flows or volumes are examined at the regional level. The purpose of this analysis is to highlight key facilities for freight transport within the region, providing an appropriate context to understand which deficiencies are most critical.
3. **Preliminary Identification of System Needs and Deficiencies:** Based on the nationwide and regional analyses for each mode, an initial set of freight system needs and deficiencies was formulated. These needs and deficiencies are discussed in general category groupings of system access, condition, congestion, and safety, as modally appropriate with the existing data.

3.1 NATIONWIDE FREIGHT VOLUMES

Rail

In the hierarchy of freight movement, rail moves have historically consisted of lower-value, heavy and bulk goods transported over long distances. As containerization entered the scene, this trend began to change; railroads shifted toward carrying higher-value goods on their intermodal routes and became more competitive with trucking in some markets. However, regardless of whether railroads carry carload or intermodal traffic, Chicago is a rail hub. Chicago is on key transcontinental rail routes, allowing trains to meet and transfer goods. Additionally, because of greater Chicago's population base, it will continue to be a hub for local goods distribution. Figure 3.1 shows that a substantial portion of national rail flows travel through greater Chicago.

Truck

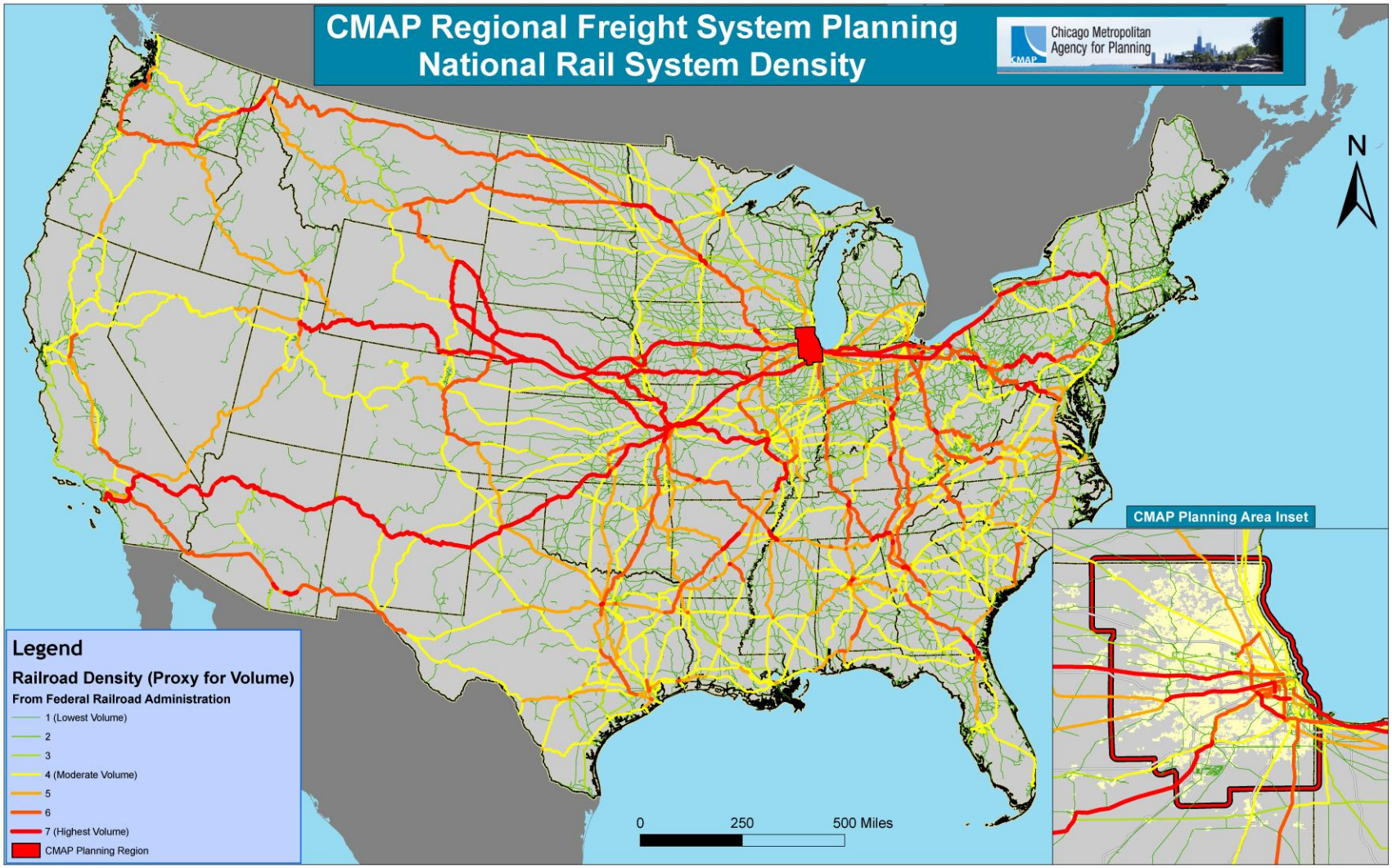
In the hierarchy of freight movement, trucking is used for higher-value, time sensitive shipments. The last mile of nearly every freight move is carried by truck due to its flexibility and ability to provide door-to-door service. Because of this, it is not surprising to see that in Figure 3.2 large urban areas appear to have the highest concentration of truck movements. This is in contrast with rail transportation, which is favorable for longer- rather than shorter-distance trips.

For freight transportation between states or over longer distances, greater Chicago is a regional trucking hub, but upon visual inspection it does not dominate in comparison with several other major urban areas such as Atlanta. However, trucking in greater Chicago is essential to distributing goods throughout the Midwest and Canada.

Water

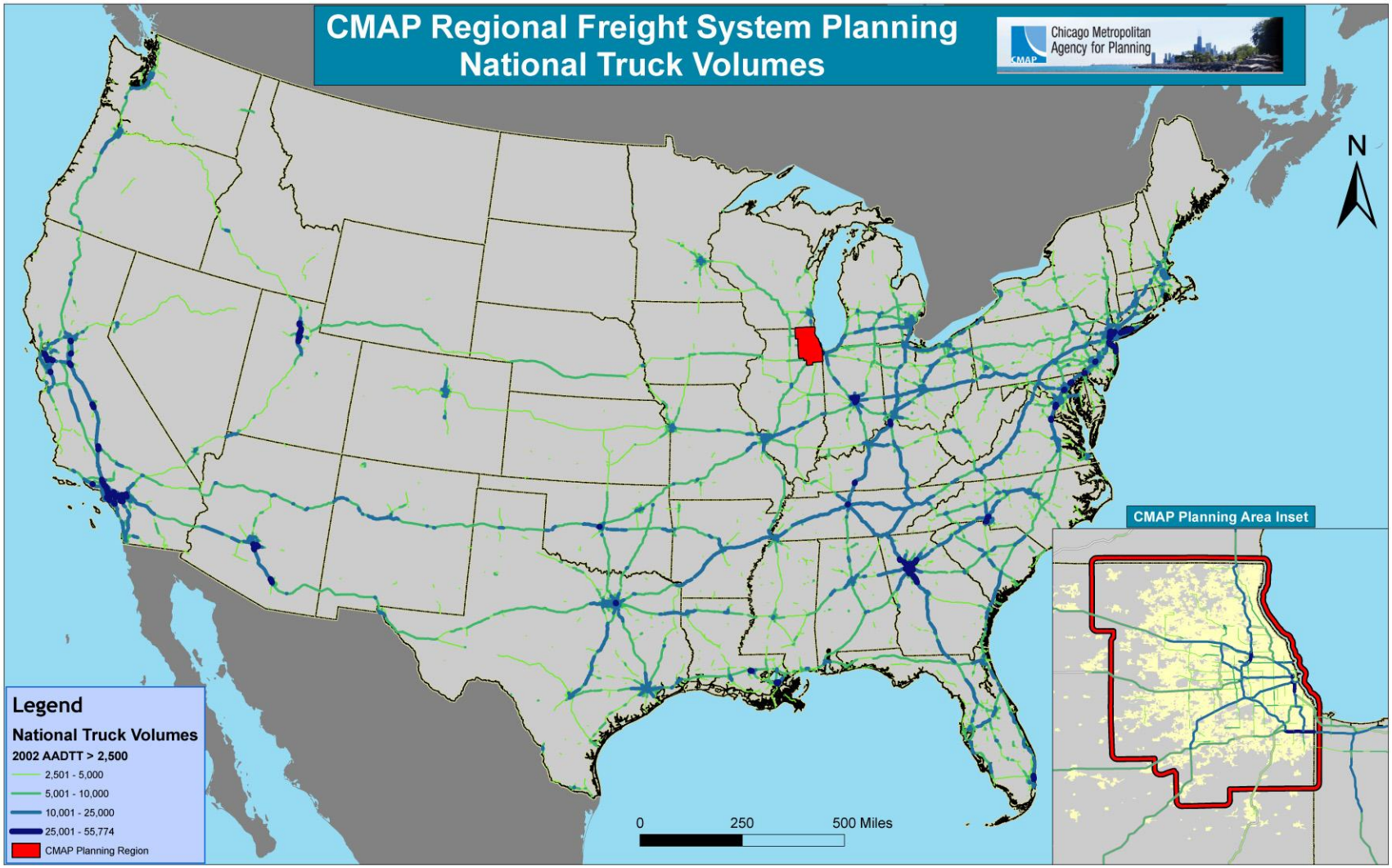
In the hierarchy of freight movement, waterborne freight typically consists of low-value, bulk goods that are not time sensitive. However, water transport is the most fuel-efficient way to move goods. As shown in Figure 3.3, greater Chicago is positioned geographically as a gateway between the Great Lakes and the Mississippi River. Upon visual inspection of these national flows, the Mississippi River has the highest waterborne freight flows on its segment between St. Louis and the Gulf of Mexico; however there is a substantial drop-off in tonnage flows in greater Chicago. This may indicate that despite its competitive geographical location for other modes of freight, and its seemingly high availability of port facilities, the region may not serve as a key hub for national waterborne freight.

Figure 3.1 Nationwide Rail Volumes



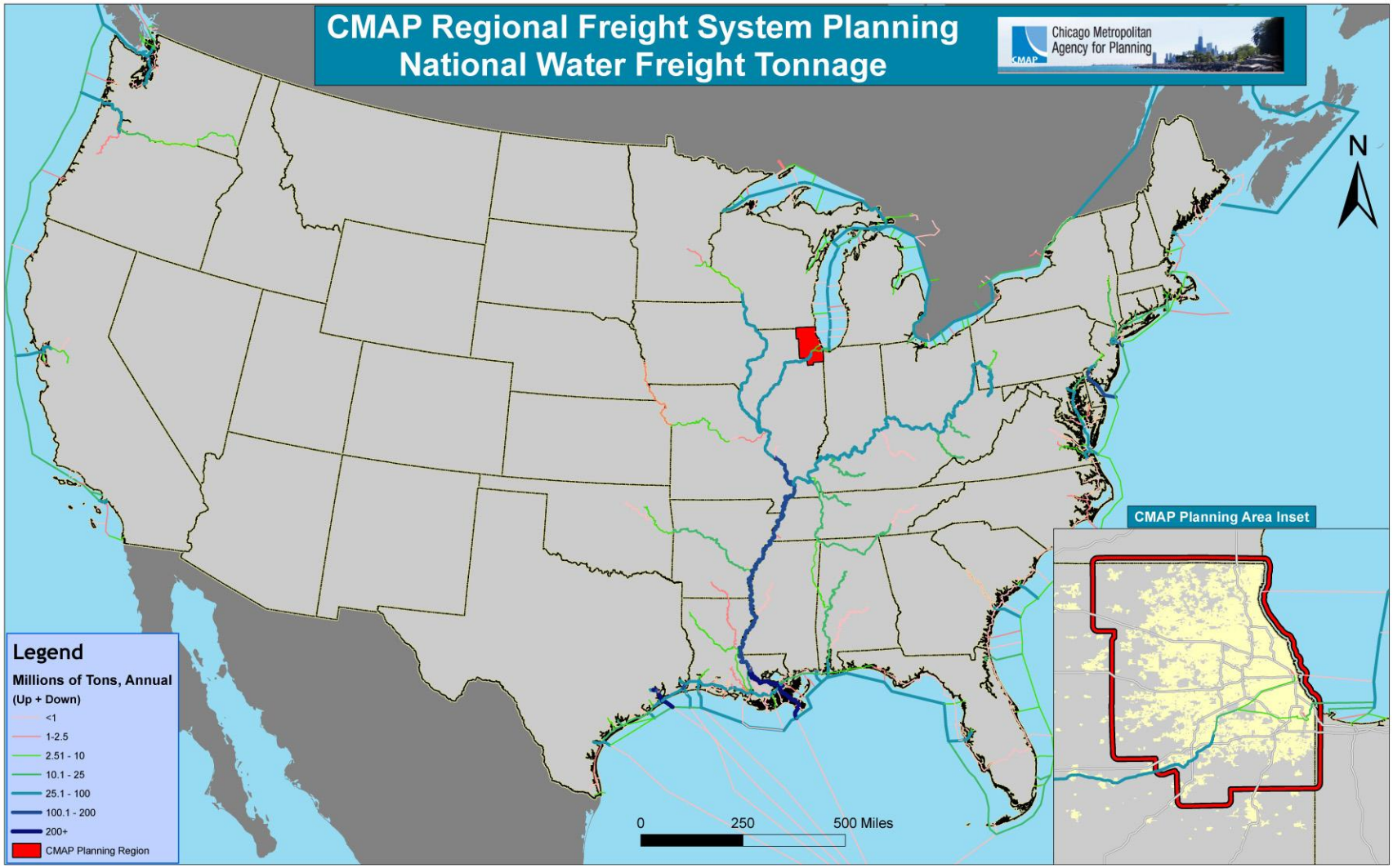
Source: Federal Railroad Administration

Figure 3.2 Nationwide Truck Volumes



Source: Freight Analysis Framework

Figure 3.3 Nationwide Water Freight Tonnage



Source: USACE

Air

Air transportation is used to haul lightweight, high-value and time sensitive goods such as medical devices, pharmaceuticals, and electronics. Greater Chicago is served by two major airports with regular air cargo service, Chicago O'Hare International Airport and Chicago Midway Airport. Nearby the Gary/Chicago International Airport also provides air cargo service. There exists a proposal for a fourth regional airport in the south Chicago suburbs which is anticipated to handle a significant amount of air cargo. The planned airport site is in Will County at the current location of Bult Field.

Airports are key to serving international goods movement and Table 3.1 shows the top U.S. airports by foreign trade cargo value. JFK International Airport is the top U.S. airport in this category. However, the combined Chicago-region airports come in second place with the Los Angeles International Airport close behind. The effort to modernize Chicago O'Hare International increases the likelihood that the Chicago region will continue to be a top provider of international air shipments.

Table 3.1 Nationwide Air Volumes: Top U.S. Foreign Trade Airports by Cargo Value
2005 U.S. Dollars in Billions

Gateway	Type	Exports	Imports	Total
JFK International Airport	Air	59.3	75.6	134.9
Chicago Airports	Air	29.1	44.3	73.4
Los Angeles International Airport	Air	36.5	36.4	72.9
San Francisco International Airport	Air	25.2	32.0	57.2
Dallas-Fort Worth Airports	Air	15.4	19.7	35.1
Anchorage Airports	Air	8.7	26.0	34.7
Atlanta Airports	Air	11.6	18.3	29.9
New Orleans Airports	Air	11.8	17.9	29.7
Miami International Airport	Air	17.8	9.7	27.4

Source: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, National Transportation Statistics 2006 (Washington, D.C.: 2006), available at www.bts.gov as of October 16, 2006.

Note: These airports appear in BTS's List of Top 25 U.S. Foreign Trade Freight Gateways by Value.

Table 3.2 shows the top U.S. airports in terms of landed weight for aircraft that carry cargo exclusively. As the data in Table 3.2 do not include all cargo that is handled at the airport, these data simply give an indication of the number of and size of cargo-only planes that utilize a given airport. Airports such as Memphis and Louisville, which serve as hubs for FedEx and UPS, dominate in terms of all-cargo operations. Anchorage serves as a major refueling point on transpacific cargo flights. These airports have developed into these roles over time in part because of geographic location, low passenger plane traffic, and infrastructure to accommodate cargo aircraft.

Table 3.2 Nationwide Air Volumes: Top 10 U.S. Airports by Landed Weight of All-Cargo Operations

Rank	ST	City	Airport Name	Preliminary CY 2008 Landed Weight	CY 2007 Landed Weight
1	TN	Memphis	Memphis International	19,392,933,674	19,543,815,307
2	AK	Anchorage	Ted Stevens Anchorage International	17,951,597,580	21,124,325,138
3	KY	Louisville	Louisville International-Standiford Field	10,445,498,827	10,431,225,402
4	FL	Miami	Miami International	6,988,513,672	7,430,213,907
5	CA	Los Angeles	Los Angeles International	6,205,242,277	6,861,236,224
6	IN	Indianapolis	Indianapolis International	5,128,484,161	5,304,551,447
7	NY	New York	John F Kennedy International	4,429,992,500	5,113,997,320
8	IL	Chicago	Chicago O'Hare International	3,668,314,900	4,401,472,100
9	CA	Oakland	Metropolitan Oakland International	3,479,843,950	3,622,968,767
10	NJ	Newark	Newark Liberty International	3,374,287,125	3,746,803,900

Source: CMAP and FAA.

Note: All-Cargo operations describe operations by aircraft that are dedicated to the exclusive transportation of cargo. Aircraft that carry both passengers and cargo are not included. Aircraft landed weight is the certificated maximum gross landed weight of the aircraft as specified by the aircraft manufacturers.

3.2 REGIONAL FREIGHT VOLUMES

Rail

Given Chicago's traditional role as a major terminus for both eastern and western railroads, high rail traffic volumes are found along rail lines within the region which serve the transcontinental rail system, as shown in Figure 3.4. Many of these lines serve as intercity and commuter rail corridors, as well. These lines are Class I railroads owned by national rail companies and approach the region from the north, west, southwest, south, and east. Goods destined to the coasts for distribution are hauled into the region on these lines and redirected to their final destination at one of many transload or intermodal facilities. As such, freight traffic is intense along these major rail thoroughfares. Moreover, high density rail traffic exists along lines which connect the Class I railroads, such as the belt railways which operate west of downtown Chicago. Another belt railway expected to play a major role in the flow of rail freight through the region is the Elgin, Joliet, and Eastern line, which arcs across the area from near Waukegan, through Aurora and Joliet, and into Indiana. Purchased by CN, a Class I railroad, rail volumes on the EJ&E are expected – and have begun – to increase. This shift of trains onto the near-dormant EJ&E is expected to relieve the flows on several currently congested rail lines, especially the belt railways.

Trucks

In greater Chicago, interstate highways carry the greatest volumes of trucks, as shown in Figure 3.5. Other roadways with very high truck volumes are found in areas with significant amounts of industrial or intermodal activity, such as Chicago's southwest side. Congestion on these high-volume roadways will be identified to determine deficiencies in the roadway network. Other deficiencies that will be examined include availability and quality of truck-related amenities such as truck parking.

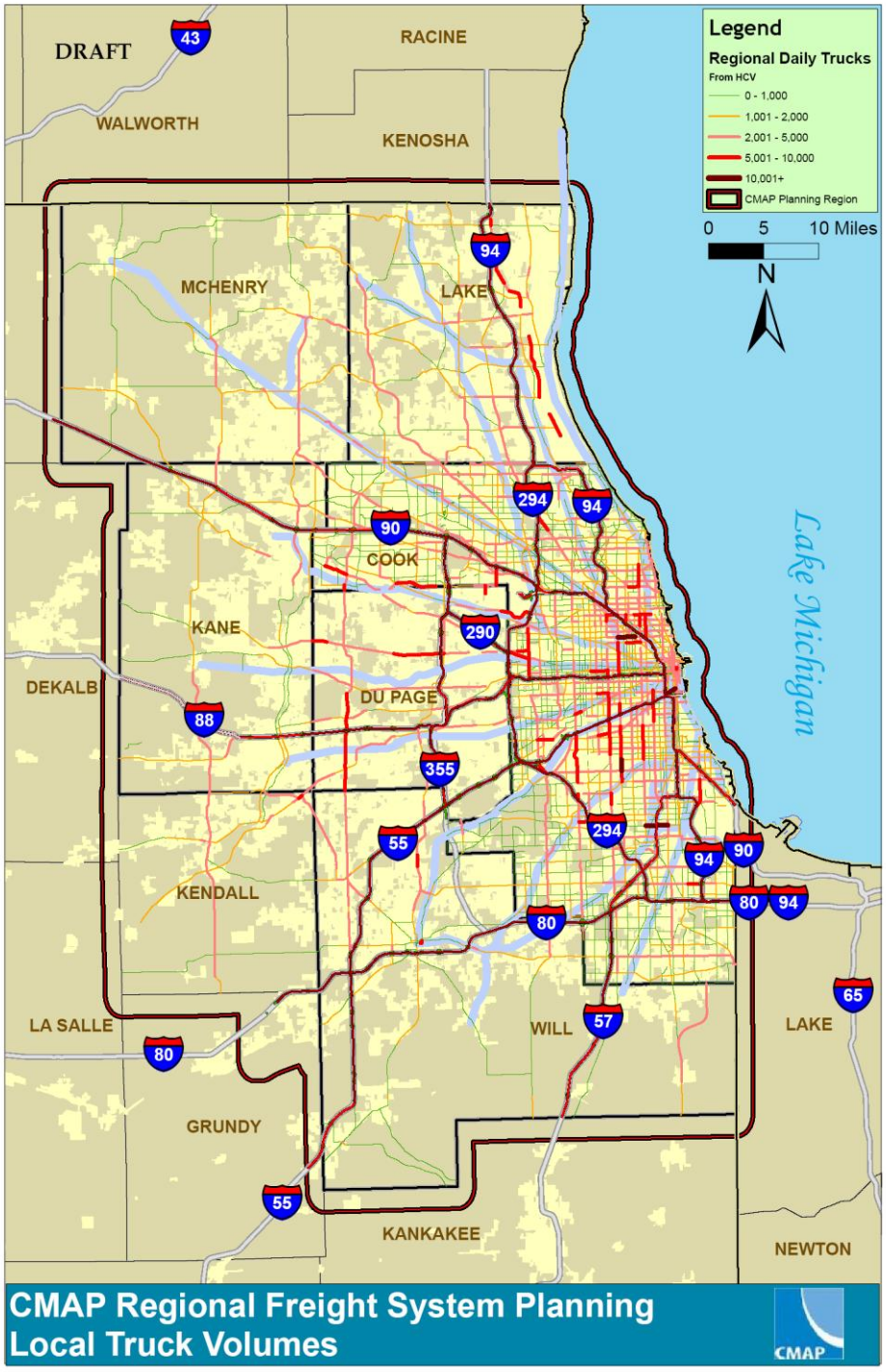
Water

In the Great Lakes region, as shown in Figure 3.6, watercraft such as barges carry substantial amounts of freight on the Great Lakes, on the Mississippi River, and on the Illinois River west of the Chicago region. However, there is a noticeable decline in freight tonnage on waterways within the Chicago region. This decline suggests that waterways in the Chicago region may be underutilized at the present time. There are many potential reasons for this. For example, the level of service (e.g., lock delays or navigable depth) on the waterways in the region may deter shippers from using these waterways. Alternatively, there may be little demand to ship commodities in this geographic area. As a result, this issue may warrant a more comprehensive exploration.

Figure 3.4 Regional Rail Volumes

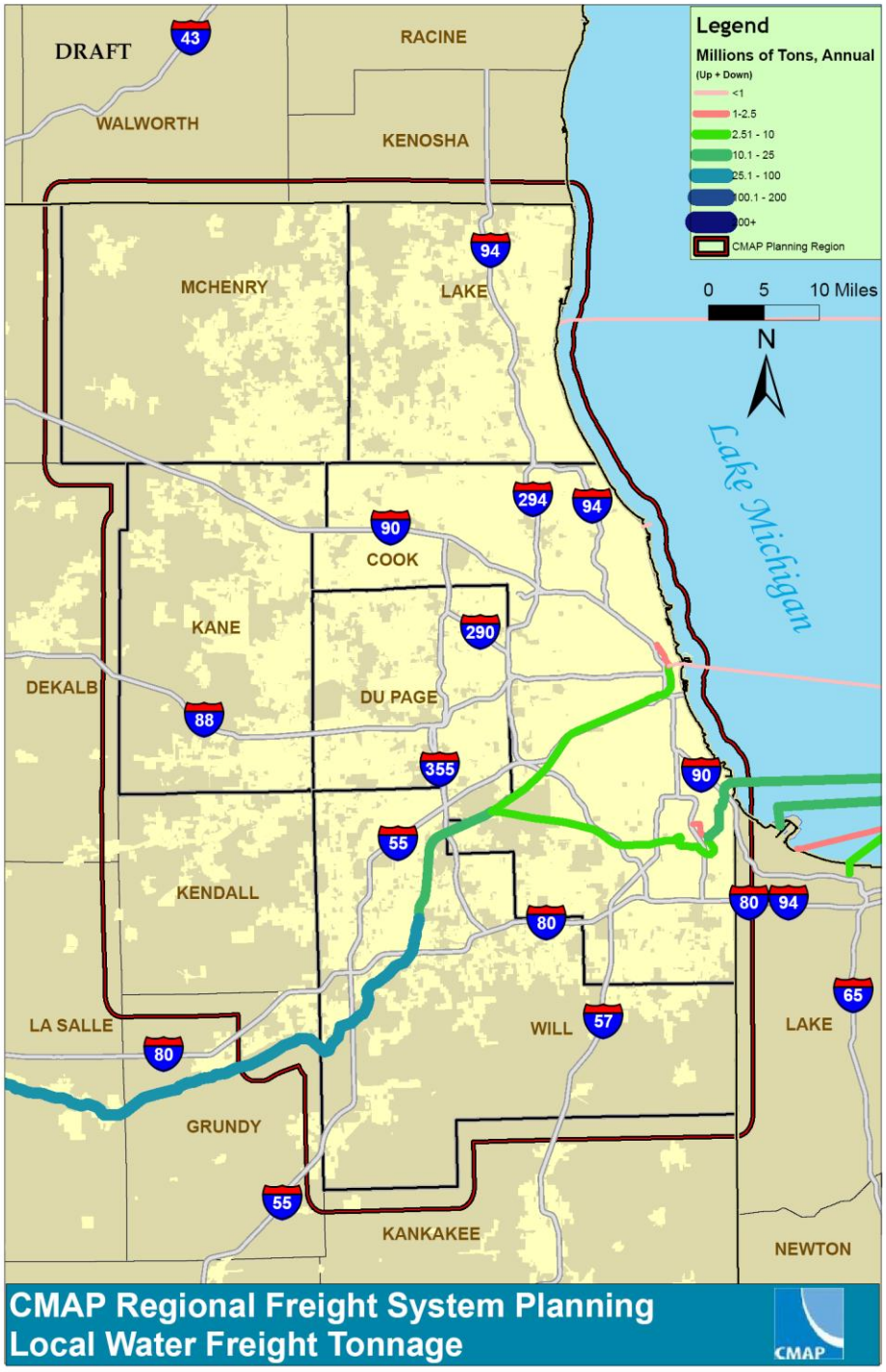
Source: Federal Railroad Administration
Note: Many of the railroads listed as "lowest volumes" are now abandoned or are in interim use as trails.

Figure 3.5 Regional Truck Volumes



Source: IRIS Roadway Data

Figure 3.6 Regional Water Freight Tonnage



Source: USACE

Air

Chicago O' Hare International Airport

Chicago O' Hare International Airport carries the bulk of the region's air cargo; 1,445,158 tons in 2008[1], with roughly one-third being domestic shipments and two-thirds being international shipments. Given the scale of this airport, freight is often trucked significant distances so that it can be consolidated for air shipments from O'Hare. The large number of freight forwarders located near O'Hare play a significant role in air cargo operations. The surface transportation conditions in the region can affect O'Hare's competitiveness for shipping of time-sensitive freight. Traffic congestion can cause trucks to miss cut-off times for flights, which may depart only once per day, resulting in significant delays for high-value, time-sensitive freight, such as pharmaceuticals, and negatively impact the national competitiveness of the airport and the region. O'Hare is in the midst of the O'Hare Modernization Program and has acquired 433 additional acres and is constructing two additional runways at an estimated cost of $6.6 billion. The program includes a new western terminal and will significantly increase the air cargo capacity of O'Hare.

Chicago Midway Airport

Chicago Midway Airport carries less freight than O'Hare (only 14,254 tons in 2008[2]), but still plays an important role in the region's freight system. Similar to O'Hare, Midway is located at a rail node with significant traffic and the I-88 and Cicero Corridors, as shown in Figure 3.8. And while goods are rarely transferred between air and rail service, the adjacent facilities offer businesses in the area easy access to a variety of shipping methods depending on their need.

Planned South Suburban Airport

A major new airport is currently in the early stages of development, including environmental analysis and land acquisition, in the vicinity of Peotone in Will County, Illinois. The South Suburban Airport is planned to eventually include six parallel runways in an east-west configuration east of I-57. The Inaugural Airport Program includes one runway, a passenger facility, and a cargo facility. IDOT projects that cargo activity at the airport will range from 0 to 73,300 tons in the first year after opening to between 35,700 and 180,100 tons after five years[3].

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[1] FAA and The Chicago Airport System (www.flychicago.com/Statistics/home.shtm).

[2] FAA.

[3] Illinois Department of Transportation. *South Suburban Airport Forecasts 2009: Verification of 2004 Forecasts.* Preliminary Draft. May, 2009. P. 30.

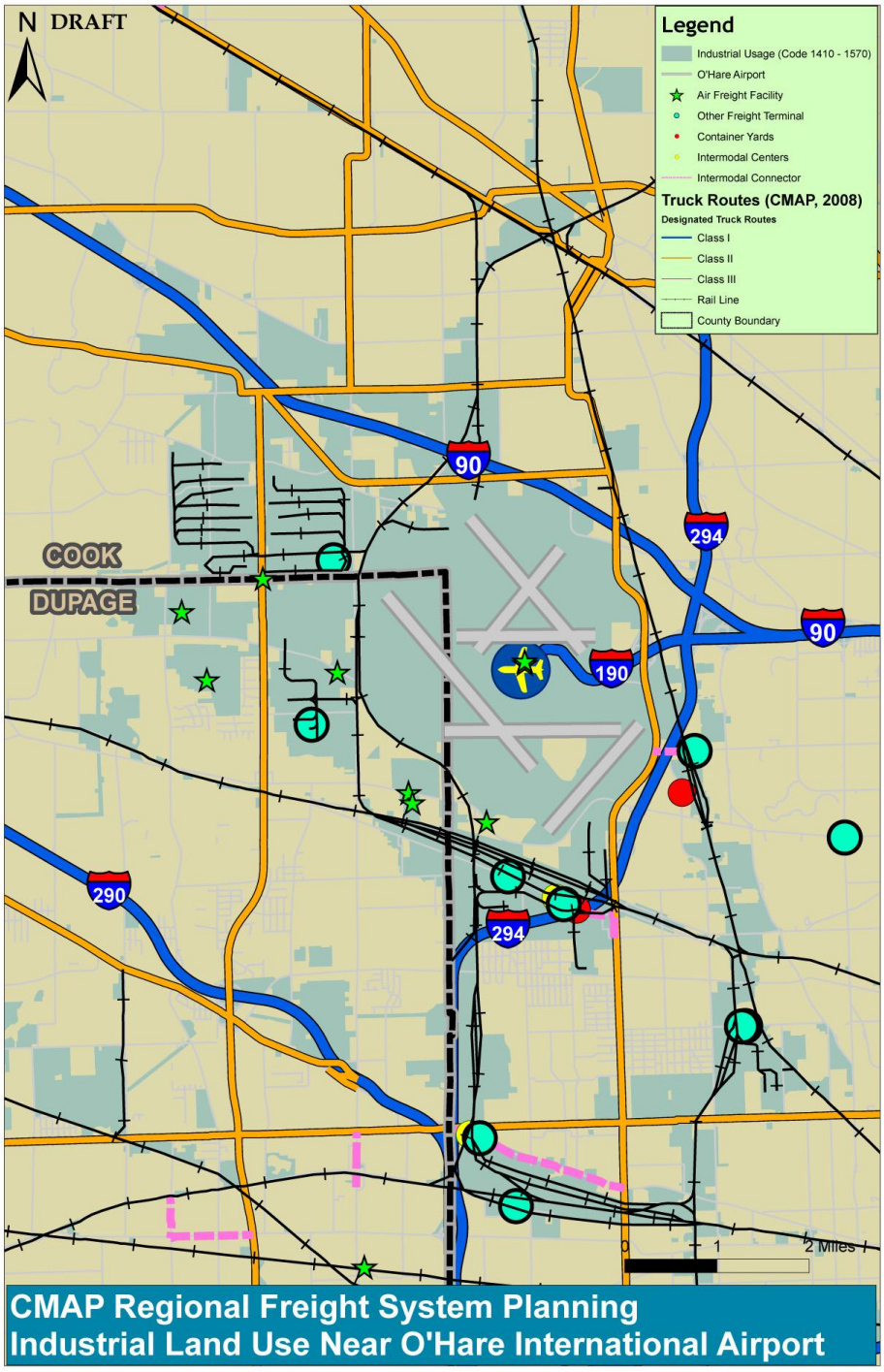
Other Airports

Surrounding the Chicago region, several other airports accommodate significant air cargo operations. The Chicago/Rockford International Airport (RFD), with the second largest UPS air parcel sorting facility, ranked 19th of all domestic airports in landed weight based on preliminary 2008 estimates[4]. The Indianapolis International Airport (IND), with the second largest FedEx air parcel sorting facility, ranked 6th in landed weight with approximately 5.1 million tons landed[5]. The smaller Chicago/Gary International Airport falls outside of CMAP's region, but still plays a role in the Chicago region's air cargo network.

[4] www.faa.gov/airports/planning_capacity/passenger_allcargo_stats/passenger/media/prelim_cy08_cargo.pdf.

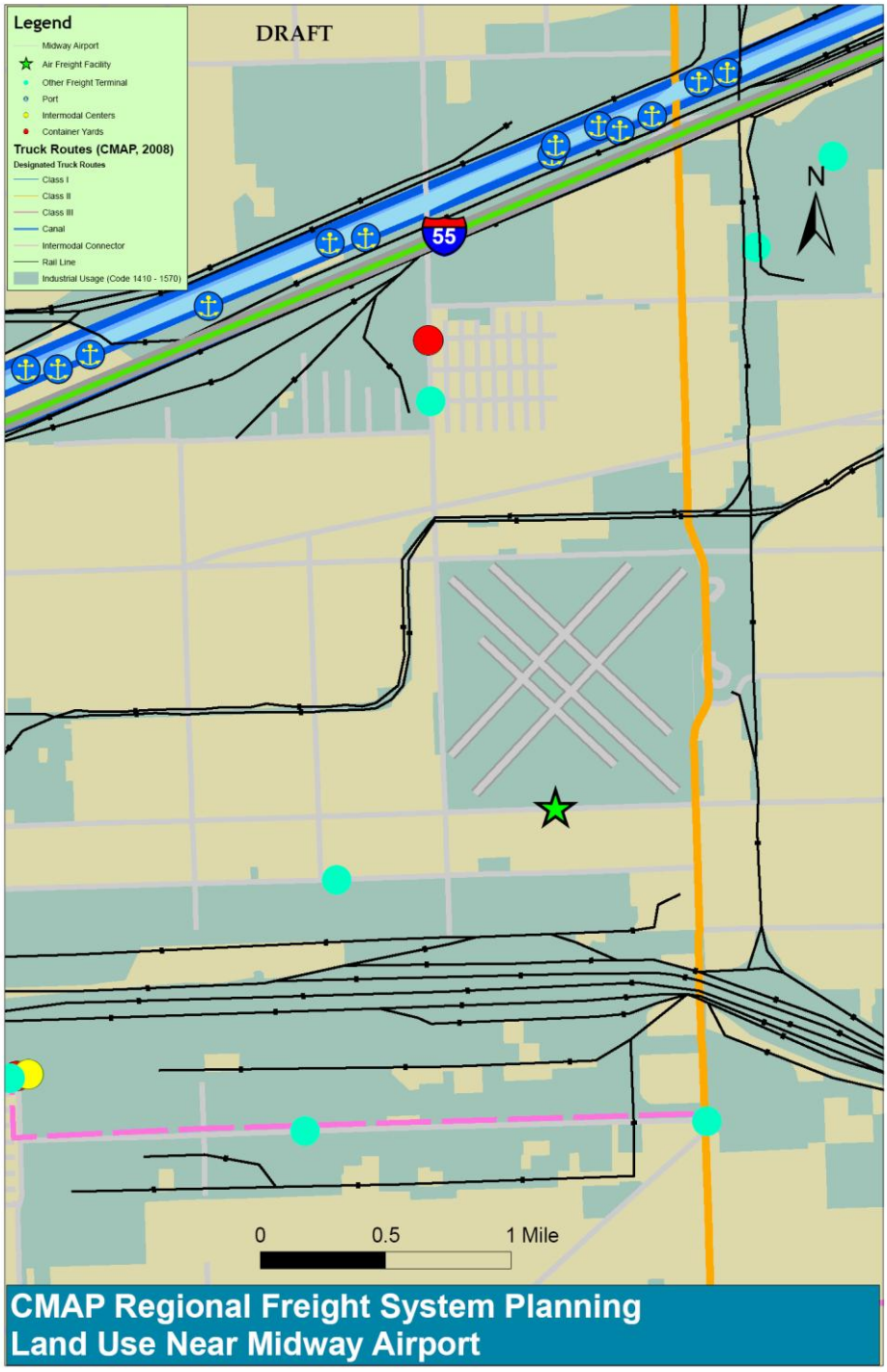
[5] www.faa.gov/airports/planning_capacity/passenger_allcargo_stats/passenger/media/prelim_cy08_cargo.pdf.

Figure 3.7 Chicago O'Hare International Airport and Surroundings



Source: CMAP, Various Sources – see Table 2.1

Figure 3.8 Chicago Midway Airport and Surroundings



Source: CMAP, Various Sources – see Table 2.1

3.3 PRELIMINARY IDENTIFICATION OF SYSTEM NEEDS AND DEFICIENCIES

Based on the nationwide and regional analyses for each mode, a first cut, high-level set of freight system needs and deficiencies was formulated. These needs and deficiencies are discussed in general category groupings of system access, condition, congestion, and safety, based on availability of existing data. A comprehensive set of needs and deficiencies will be determined later in this study by augmenting this data synthesis effort with stakeholder interview results and Transearch data analysis.

Rail

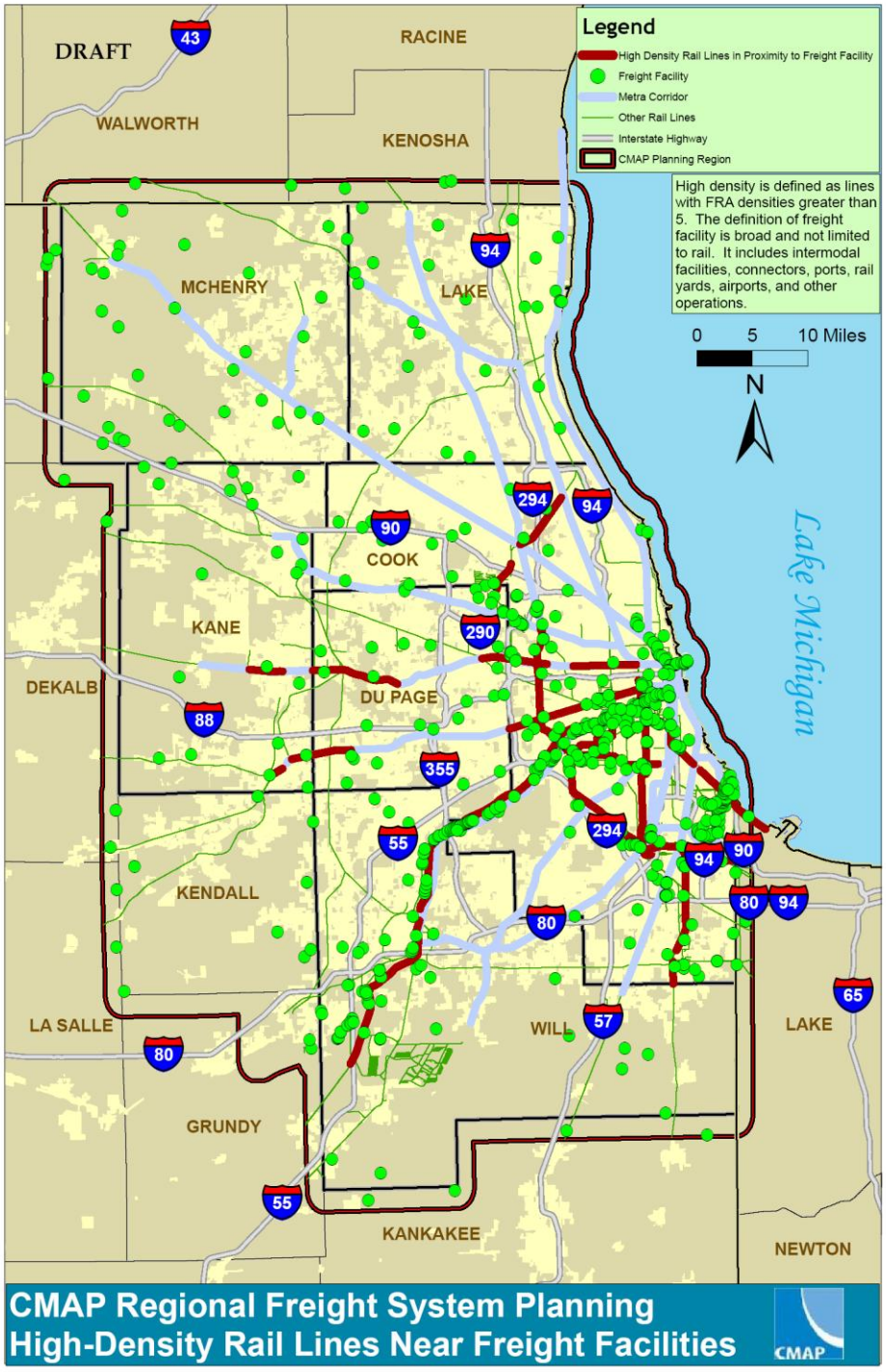
Rail Congestion

Greater Chicago is the nation's rail crossroads. Congestion on its rail lines reflects this position. Nearly 500 freight trains operate within the region daily on constricted infrastructure, creating high densities shown in Figure 3.9. To help alleviate the region's rail needs, the U.S. Department of Transportation, Illinois Department of Transportation (IDOT), City of Chicago, Metra, Amtrak, and the nation's freight railroads entered into a partnership aimed at improving the region's rail efficiency through infrastructure and other improvements. The Chicago Region Environmental and Transportation Efficiency project, known as CREATE, is underway and seeks to upgrade five critical corridors, mostly in the City of Chicago. These upgrades include the construction of flyovers, grade separations, improved signalization, and modernization of equipment. The final stage of CREATE project implementation is scheduled to begin in 2011.

Many of the region's rail bottlenecks occur on railways with high freight rail density in proximity to freight facilities (Figure 3.9). Most of these are being addressed directly through CREATE, but some bottlenecks are present along the transcontinental railroads leading west and southwest, specifically BNSF's lines through Aurora and Joliet and UP's line through West Chicago, all locations where junctions with the EJ&E exist along with rail yard operations. These bottlenecks may need further evaluation to determine their impact on regional rail flows.

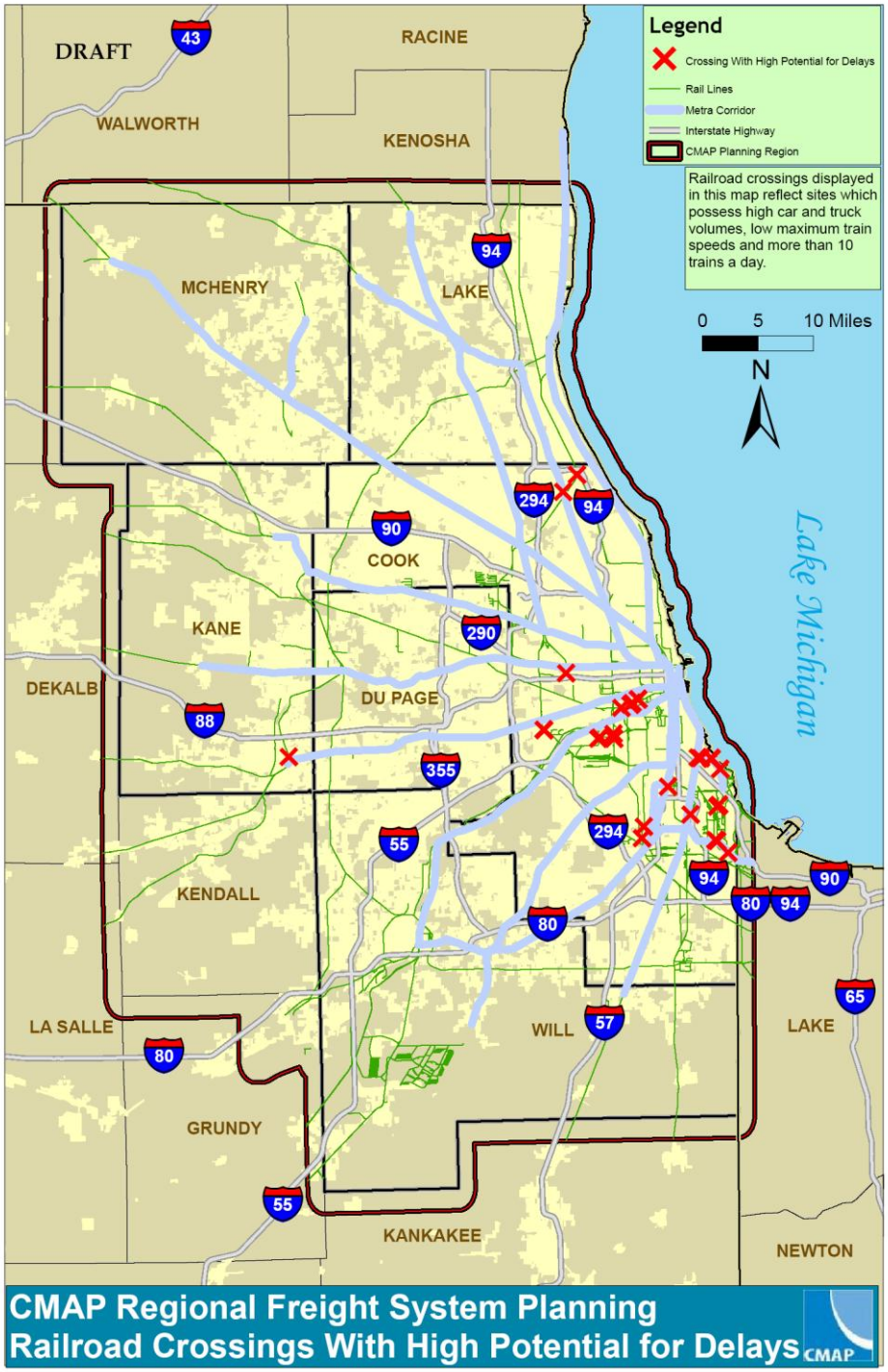
Another potential source of congestion is grade crossings in which a large number of trucks traverse rail lines with high volumes and slow maximum train speeds, shown in Figure 3.10. In addition to being a safety hazard, these crossings present challenges for both truck freight and rail traffic with the potential for delay.

Figure 3.9 Regional Rail Density



Source: CMAP, Various Sources – see Table 2.1

Figure 3.10 Major Truck-Rail Delays



Source: CMAP, Various Sources – see Table 2.1

Rail Access

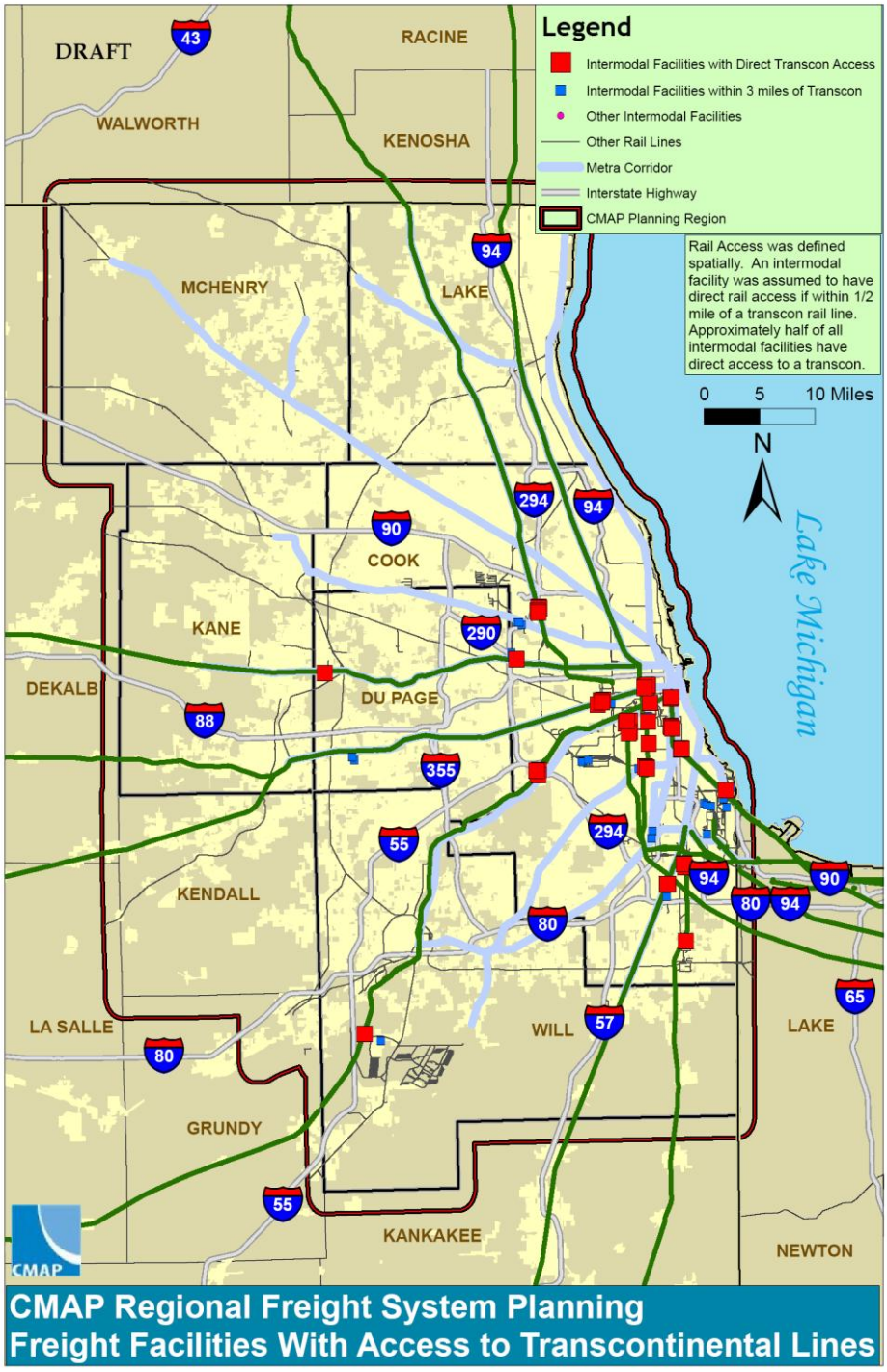
Greater Chicago's status as a national freight rail hub depends partially upon the most direct access to the transcontinental system created by the synergy of the Class I railroads in the area. Approximately one-half of all intermodal facilities are within one half-mile of such lines, shown in Figure 3.11. There may exist connectivity issues with the other intermodal facilities which spur systemic delays.

The issue of spatial access requires further investigation. It is recognized that operational issues have substantial impact on the practical access a terminal enjoys. In addition, belt rail systems also provide substantial access benefits for rail terminals.

Rail Safety

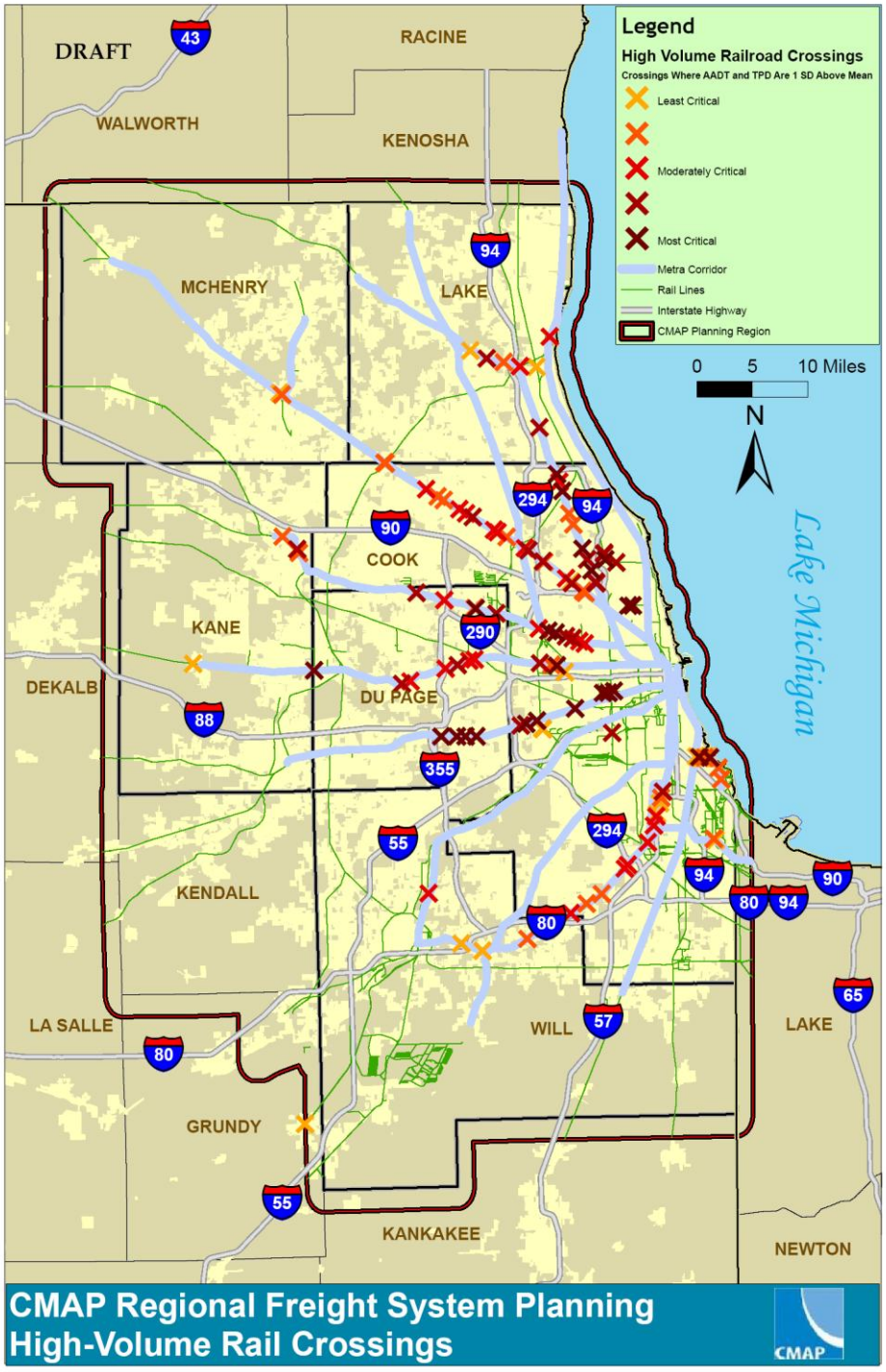
In addition to easing congestion, the improvements slated under the CREATE project also enhance rail safety throughout the region. Beyond the CREATE project, however, several safety concerns and opportunities for improvement exist. Crossings containing high volumes of both trains and vehicles present the highest risk of exposure to collisions, shown in Figure 3.12. Spatial analysis of these crossings shows a clustering around Metra lines. This finding is logical given the nearly 800 daily Metra trains in the region. Nevertheless, crossings where vehicle volumes and train volumes are both one standard deviation above the mean also appear in places critical to rail freight traffic, such as the Hawthorne Yard in Cicero. Mitigating these high-volume crossings should be a regional goal given the dangers and costs associated with train-vehicle collisions.

Figure 3.11 Access to Transcontinental Rail Lines



Source: CMAP, Various Sources – see Table 2.1

Figure 3.12 Major Truck-Rail Safety Conflicts



Source: CMAP, Various Sources – see Table 2.1

Trucks

Pavement Condition

CMAP is in the process of completing a study that evaluates pavement quality on key roads in the region, including truck routes. The results from this study will be discussed in a later stage of the Regional Freight System Planning Recommendations project.

Regional Roadway Congestion

Figure 3.13 shows the Travel Time Index (TTI) for peak period travel on roadways throughout the region. The TTI is a value that is obtained by dividing the peak period travel time by the free-flow travel time. For this figure, a.m. and p.m. peak TTI were compared and the more severely congested index of the two periods is displayed. For this analysis, a TTI of less than or equal to 1.20 is considered to represent a low level of congestion; travel times are only slightly longer than free-flow travel times. Congestion is considered to be moderate when TTI is between 1.20 and 1.40 (i.e., when travel times are 20 to 40 percent longer than free-flow travel times). TTI values of 1.41-1.60 and 1.61-1.80 represent "high" and "very high" congestion, respectively, while anything above 1.80 is considered "severe."

Most of the roadways in Chicago are at least moderately congested during the peak periods. These areas that may warrant further exploration include:

- Traffic congestion on the regional interstate system is generally severe, particularly in the peak travel periods. Freeways and tollways that exhibit severe peak congestion include:
  - The Kennedy;
  - The Eisenhower;
  - The Edens; and
  - The portion of I-55 that is west of I-294.

  Several other freeways and tollways exhibit relatively high peak congestion, include:
  - The Eisenhower extension and IL-53;
  - The portion of I-55 that lies in Cook County; and
  - The Tri-State Tollway (I-294).
- In Chicago:
  - Far north and northwest areas of Chicago;
  - Far south and far west areas of Chicago; and
  - The Chicago Central Business District (CBD) the worst peak period congestion is in the east-west direction. Traffic flows in the CBD face

levels of congestion that are similar to the rest of Chicago during the a.m. and p.m. peak periods.

- Scattered areas throughout suburban Cook County, including:
  - I-55/I-294 junction in southern area; and
  - Lake Street and various roadways near O'Hare in northern Cook.
- Scattered locations of moderate to severe congestion are found throughout McHenry, Kane, Kendall and Will Counties, but there generally are no areas of systematic congestion in these areas outside of southeast McHenry County.
- In contrast with the other collar counties, Lake County shows more areas of higher TTI, overall. Congestion in Lake County appears to be more severe in the north-south direction with some moderately severe congestion in the east-west direction as well.

Truck Parking

According to a recent study by IIT,[6] truck parking in the Chicago region generally "works very well, but a small fraction of the trucks generate nuisance parking problems," such as parking on highway ramps or shoulders due to lack of available spaces at formal lots. Figure 3.14 shows the location and size of existing parking facilities. Truck parking is most problematic in the southern area of the region, particularly along I-294 and I-80.

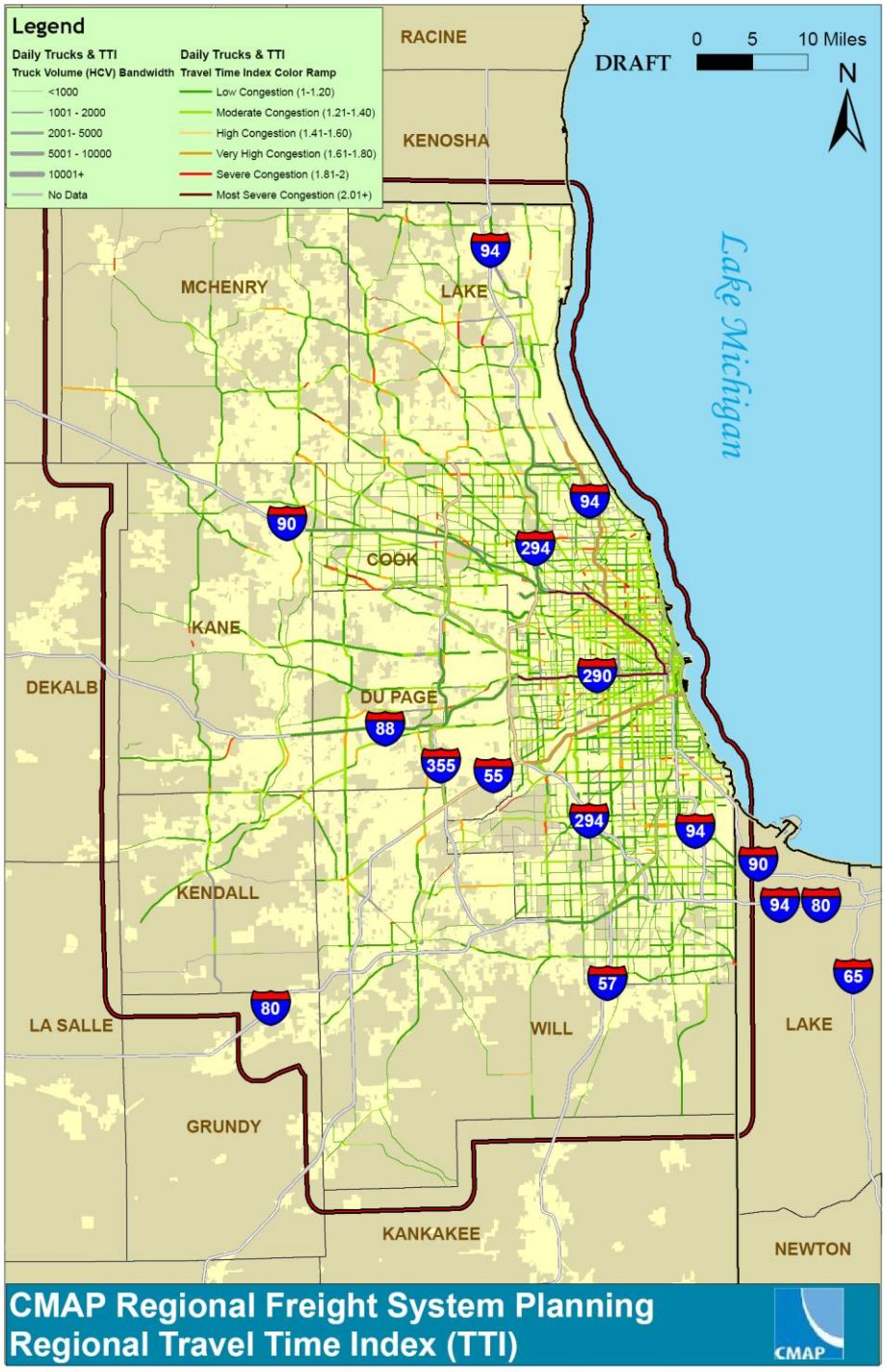
Roadway Vertical Clearances

The Chicago region has dozens of locations where vertical clearance limitations interfere with truck movements, limiting accessibility and causing circuitous detours. These clearance issues may warrant further study or potential improvements in the future, particularly in the following locations:

- On roadways that serve as truck routes or intermodal connectors;
- In areas where there are several consecutive clearance conflicts that force significant route diversions by trucks, such as along the Skyway in southern Cook County; and
- In areas of concentrated industrial land use, such as on Chicago's near West Side.

[6] Beltemacchi, P., Rohter, L., Selinksky, J. and T. Manning. *Truckers' Park/Rest Facility Study.* Research Report FHWA-ICT-08-018: A Report of the findings of ICT-R27-16 by Illinois Center for Transportation. July 2008.

Figure 3.13 2007 PM Peak Travel Time Index



Source: CMAP, Travel Time Index
Note: Dan Ryan, Kingery, Bishop Ford, and Tri-State facilities were unavailable because of construction.

Figure 3.14 Truck Parking Facilities

Source: Truck Parking Studies conducted by CFIRE and IIT

Water

Lock Condition

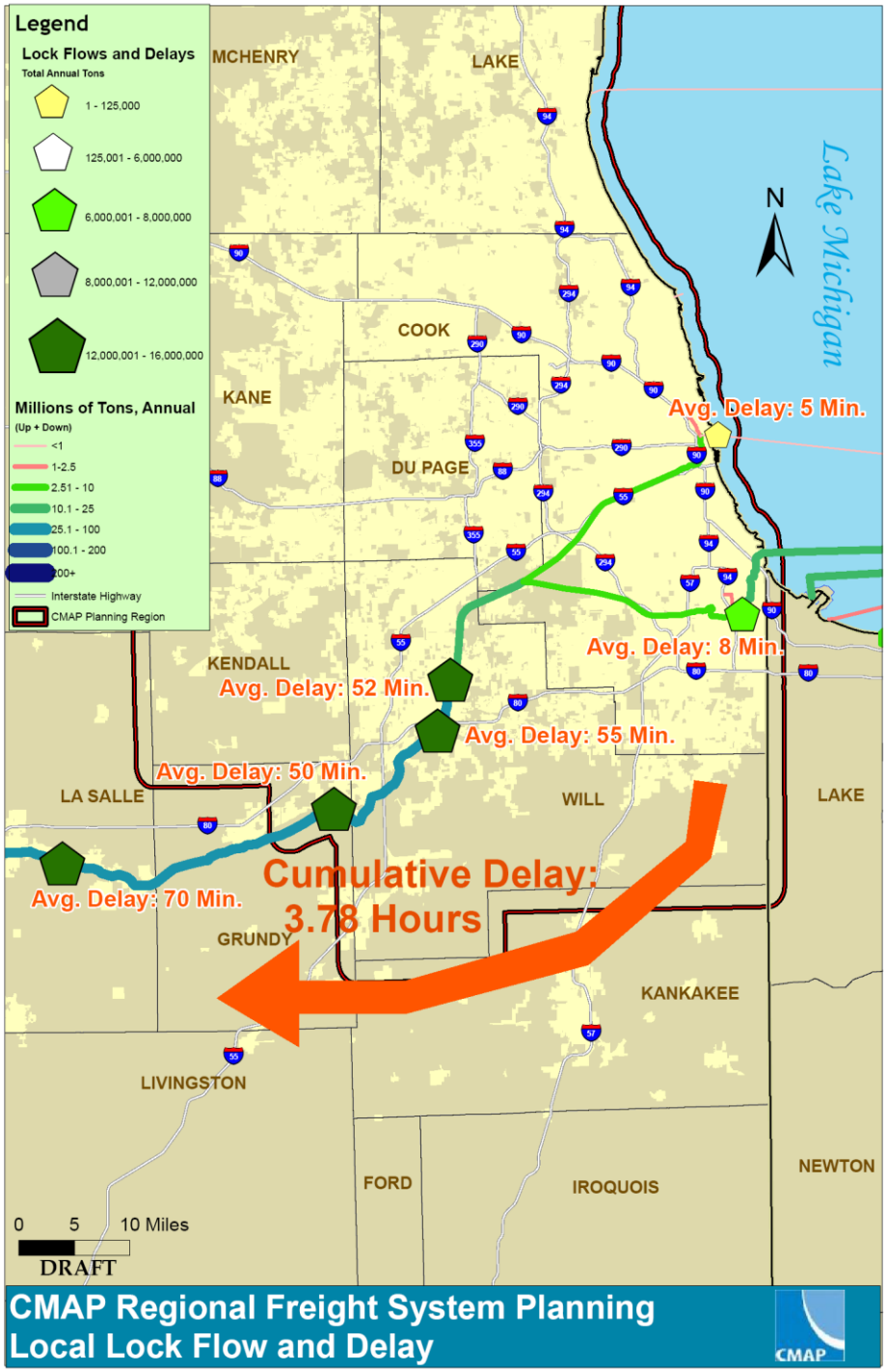
Waterborne freight transportation in greater Chicago region had historically been a dominant mode. An extensive waterway system was developed to provide full connectivity between Chicago, the Great Lakes, and the Mississippi River. But like much of the U.S. transportation system, water infrastructure in the region was built many decades ago and may be presenting level of service deficiencies to freight operators today.

Lock Delay

Watercraft that use the Chicago Harbor or Thomas J. O'Brien Locks face average delays of less than 10 minutes at these locks, as shown in Figure 3.15. However, watercraft that use the locks in Will County and beyond face average delays of at least 50 minutes per lock. Compared to the Cook County locks, demand for the Will County locks appears to be relatively substantial (about 12 to 16 million annual tons per lock in Will compared to eight million or less in Cook). As a result, for these high volumes of freight, delays at the Will County locks quickly add up for even relatively short-distance trips; a trip from northern Will County to adjacent Grundy County can incur several hours of delay.

Delays at these outer locks may warrant improvement; however, more study should be undertaken to substantiate this recommendation based on acceptable standards for water freight operators.

Figure 3.15 Water Freight Tonnage and Delay at Locks in Chicago Region



Source: USACE

Intermodal Connectivity and Land Use

Land use designation and appropriateness of freight facility siting can be significant factors in how the freight system performs. Successful examples of intermodal connections and appropriate levels of modal accessibility have emerged in corridors that have historically served freight-related purposes. In particular, the original dominance of water and rail in the Chicago region set a precedent for significant freight-related land use, and freight facilities in general, to be located along waterways and in rail corridors. As Figures 3.16 through 3.18 show, this trend is particularly true today along the region's freight waterways, in southern Cook County, and on the southwest side of Chicago. Other "newer" modes also have created concentrated clusters of freight-related facilities, such as around O'Hare International Airport.

But convenient intermodal connections and modal accessibility have degraded in recent years and continue to be threatened today, in part due to how land use is designated and developed. Figures 3.19 through 3.21 demonstrate that today residential, office, and shopping land uses dominate the regional landscape in comparison to industrial or freight-related land uses. This is due to the fact that over the last several decades the surrounding suburban population has grown to about five million; in combination with this growth, in general, the U.S. is shifting to a service-based economy and freight-related land use designation and development has not kept pace with designation of other types of land uses.

This situation presents tremendous conflict to the operational efficiency of greater Chicago's freight transportation, as well as the passenger system where services share infrastructure. Freight volumes have grown significantly in recent years and existing central city freight facilities have been jury-rigged to serve the increased flows; primarily operational changes have been made to accommodate flows within existing site footprints. However, as these older, smaller sites reach their capacity, new options are being explored in suburban areas where green fields are ample, allowing design of the most appropriate facilities for given operations. While construction of these new suburban facilities seem an obvious solution to freight industry infrastructure needs, they create new situations for the communities where facilities are sited including increased truck traffic, increased rail traffic, wear and tear on infrastructure, noise and air quality concerns as well as overall safety concerns and other issues. Thus, it is crucial to consider the most appropriate locations to designate freight-related land use for both industry and community benefits.

Additional intermodal connectivity and land use issues specific to each mode are presented below.

Rail: The rail system today faces a complex set of land use challenges that are being addressed largely by the Chicago Rail Economic Opportunities Plan (CREOP) programs. The CREOP program is an intensive, multiparty effort to preserve and establish rail-related land use in designated areas. Many freight-heavy rail lines have fallen into disuse or are currently underutilized. Preserving

these corridors for freight rail could be important in the future in the event that rail should experience an unexpected resurgence. For example, if gas prices increase dramatically, it is possible that fuel-efficient modes such as rail and water may face heavily increased volumes.

Trucks: As trucks have a ubiquitous transportation network in the Chicago region, trucks that require intermodal services generally have great flexibility in controlling their service locations and operations. As such, it does not appear that trucks face particularly unique issues related to land use or intermodal accessibility beyond highway network accessibility issues related to cost and placement of tolls, truck restrictions, low clearances, weight restrictions, congestion, and other network issues described in previous sections.

Water: Water freight facilities such as ports have historically been located along the major rivers and channels of the region, including the Chicago River, the Chicago Sanitary and Ship Canal, the Calumet River, the Calumet-Sag Channel, and the Illinois River, as shown in Figures 3.16 through 3.18. Information about the ports that are shown in these figures was obtained from an Army Corps of Engineers survey that was last conducted for the area in 1995. As a result, while a number of these ports are still active, many of the hundreds of ports that are pictured either are no longer used or are no longer in existence. Reasons for their decline include:

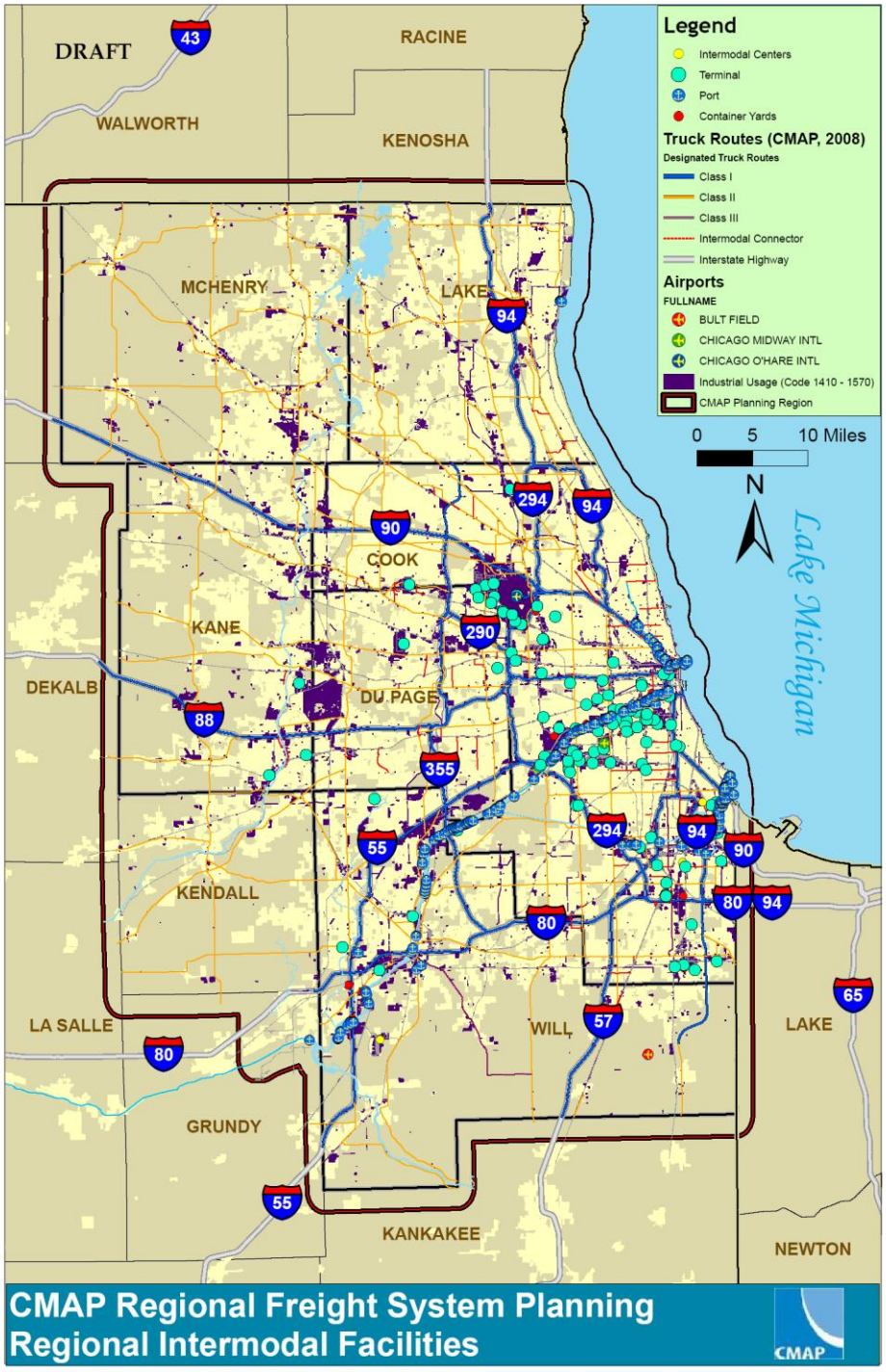
- A decrease in manufacturing in the region over the past several decades has created less demand for water ports;
- The increase in feasibility of other modes (especially truck and air) has led to diminished use of water freight shipping in general; and
- Land use conversions.

In many cases land parcels that were occupied by an unused or underutilized port were, in many cases, converted to other land uses (such as residential or office) and were subsequently converted to dwellings, office buildings, and other uses. Likewise, with decline in manufacturing overall, parcels that are located near ports and that were formerly used for industrial purposes have, in many cases, been converted to other land uses such as residential or office. The diminishing availability of industrial land in close proximity of ports affects viability of ports for freight operations at a fundamental level. For example, if a port is surrounded by warehouses, then that port is well positioned to accept goods and store them. But if these warehouses have been converted to residential lofts, then the port may have trouble expanding its operations to include a storage component.

Part of the conflict between port and other uses in Chicago is a legacy of the former structure of the port industry. The former convergence of rail, water, and industrial uses worked to the benefit of all three uses in the past. The removal of water terminals away from major rail and industrial operations and to Calumet Harbor may have weakened the water transportation industry's access.

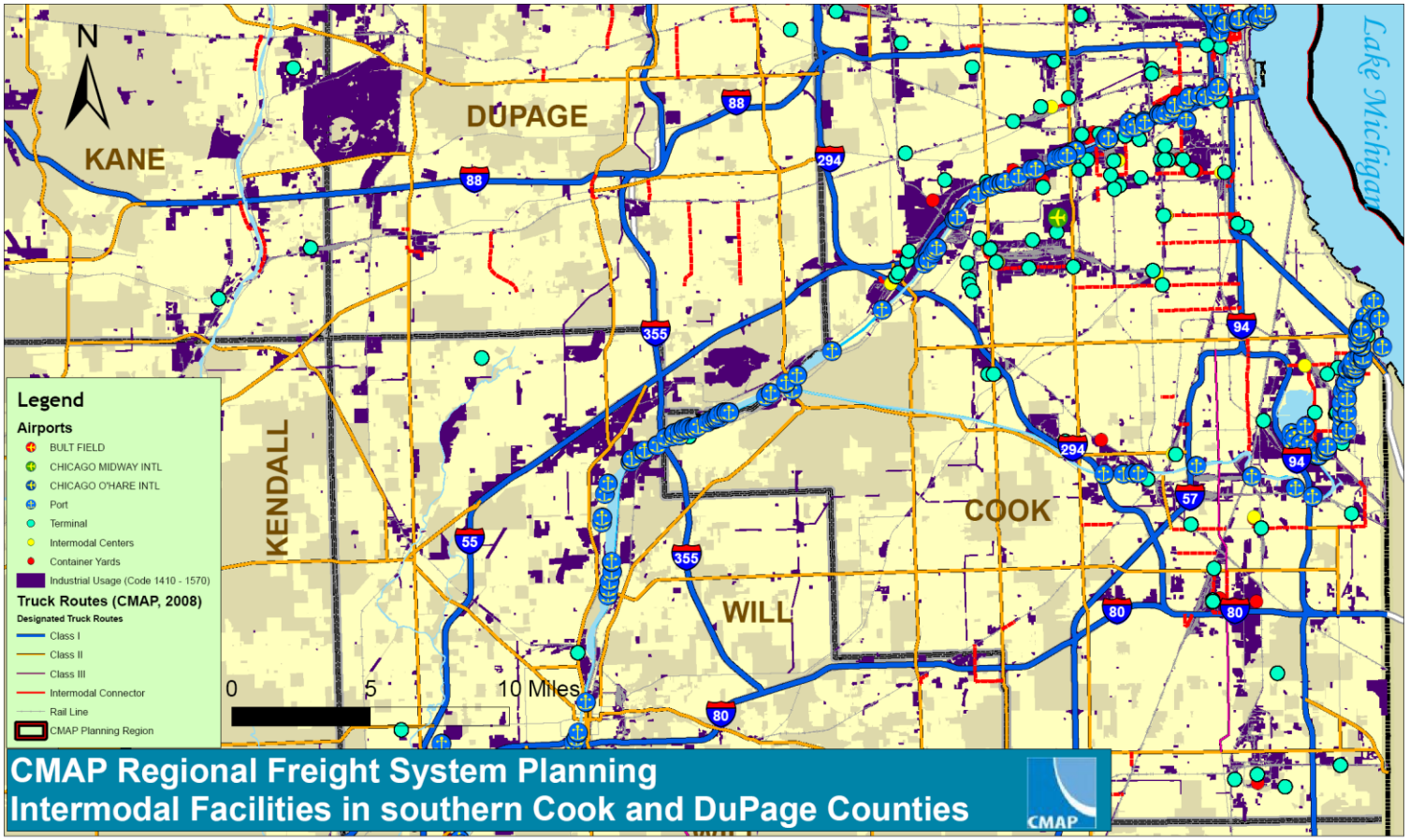
Air: O'Hare International Airport has good intermodal access due to its location in the midst of a largely industrial area, as shown in Figures 3.16 and 3.19. Canadian National's Schiller Park intermodal facility lies to the east. Canadian Pacific's Bensenville intermodal facility lies to the south. Union Pacific's Elk Grove Village rail yard is just west of the airport. There are numerous freight trucking firms located in the area as well as transload and warehousing facilities. The I-190 spur offers freeway access directly to the airport with connections to I-294 and I-90, and I-290 is just to the west and south.

Figure 3.16 Intermodal Freight Facilities in the Chicago Region



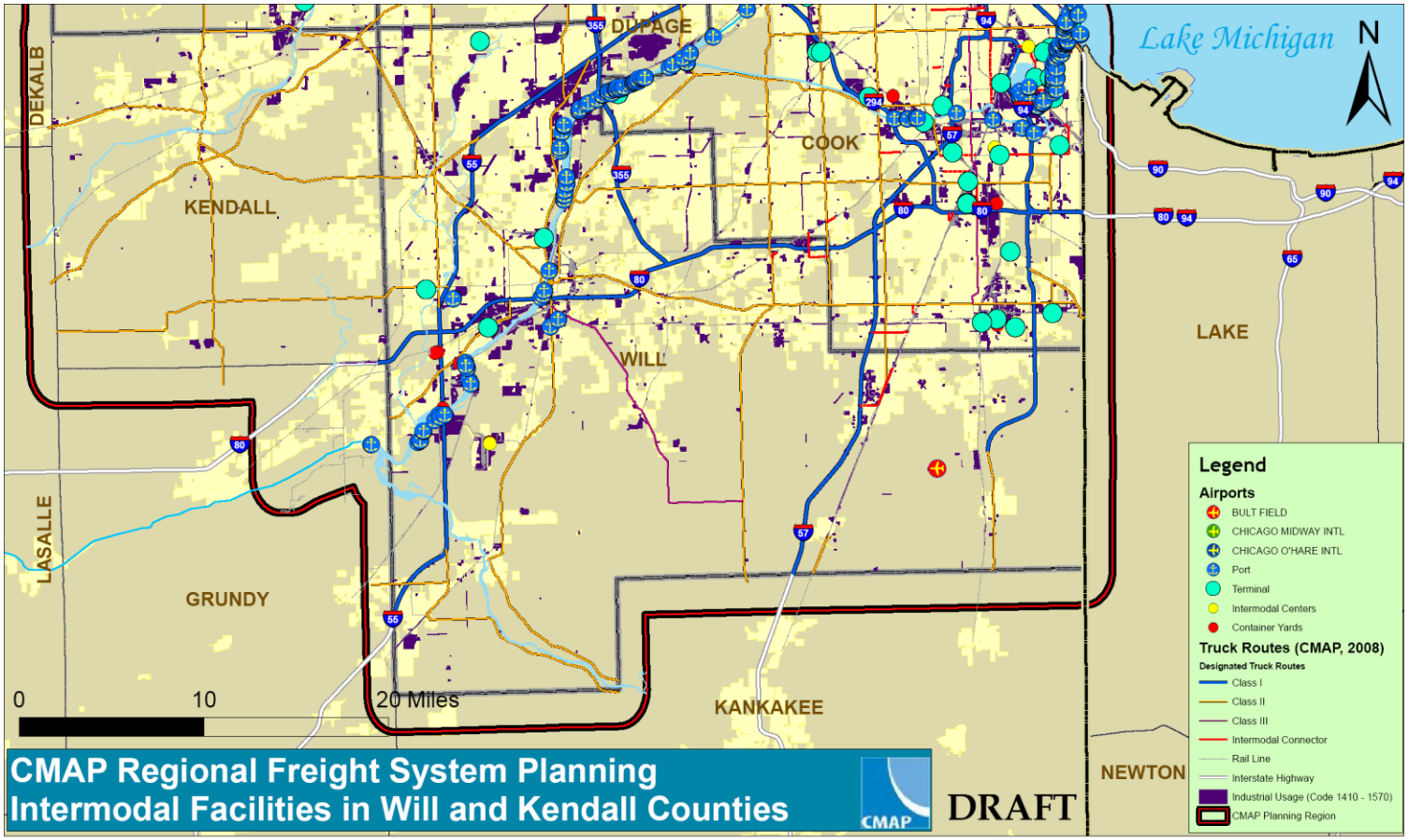
Source: CMAP, Various Sources – see Table 2.1

Figure 3.17 Intermodal Freight Facilities in Southern Cook and DuPage Counties



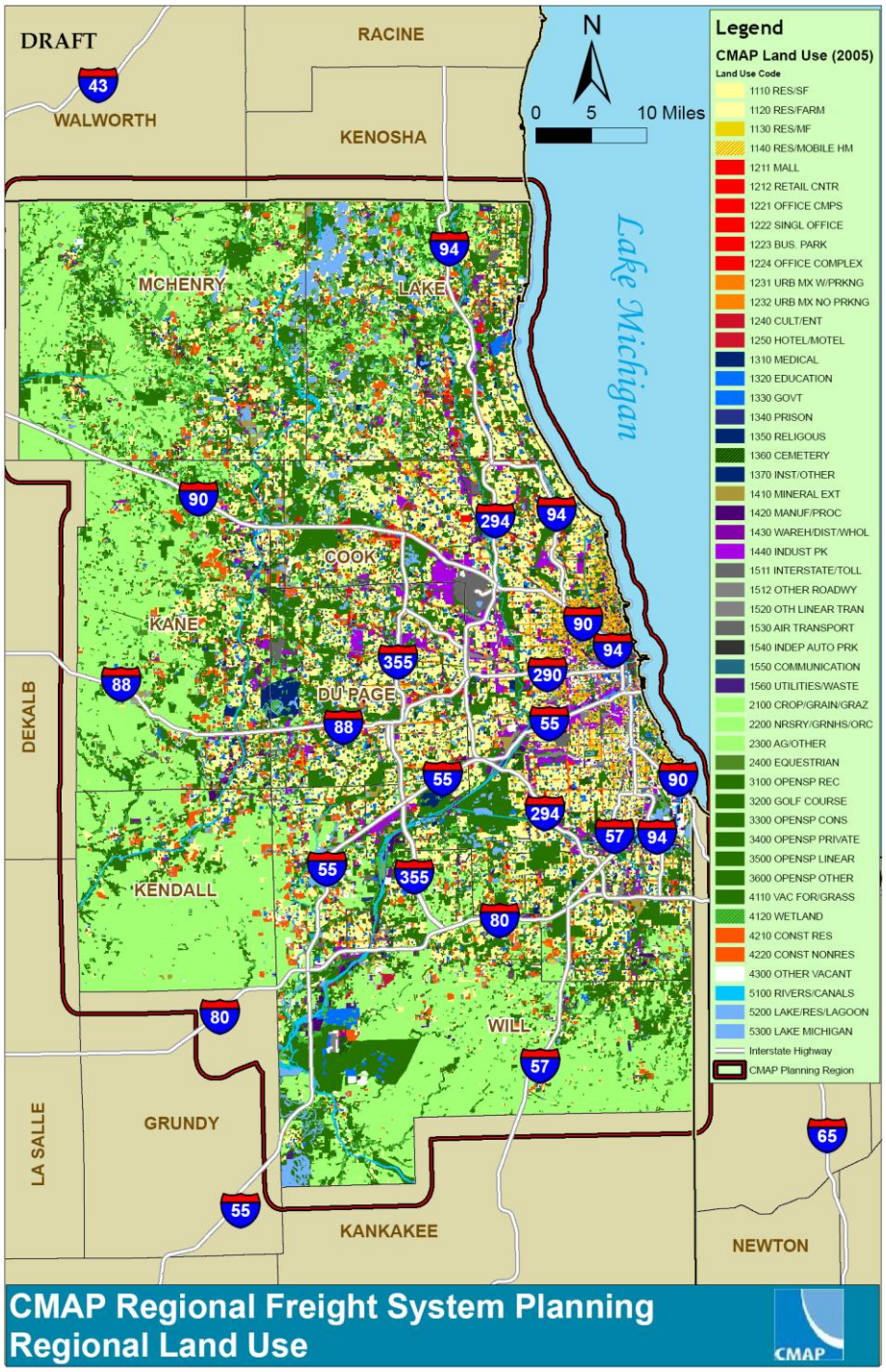
Source: CMAP, Various Sources – see Table 2.1

Figure 3.18 Intermodal Freight Facilities in Will and Kendall Counties



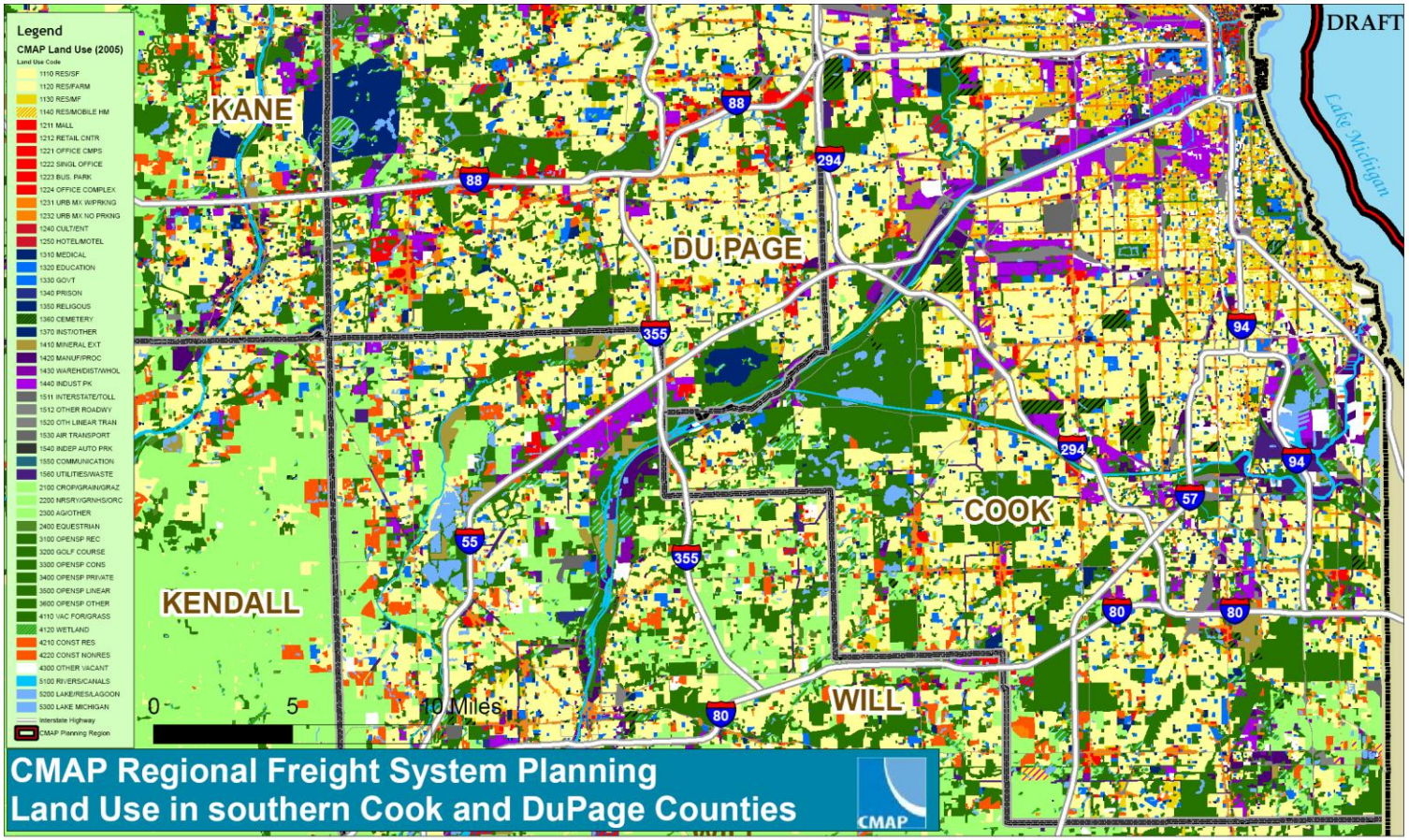
Source: CMAP, Various Sources – see Table 2.1

Figure 3.19 Land Use in the Chicago Region



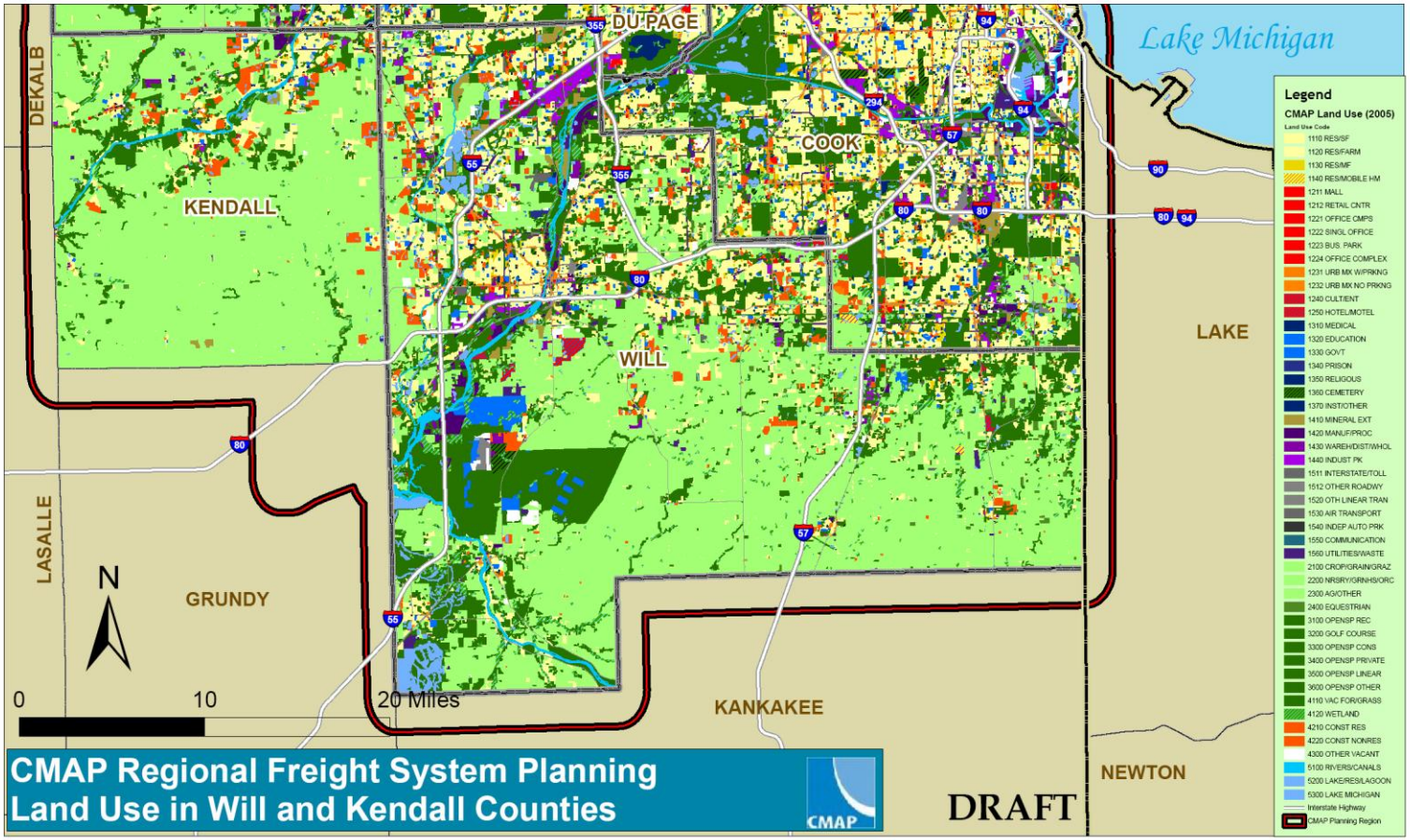
Source: CMAP, Various Sources – see Table 2.1

Figure 3.20 Land Use in Southern Cook and DuPage Counties



Source: CMAP, Various Sources – see Table 2.1

Figure 3.21 Land Use in Will and Kendall Counties



Source: CMAP, Various Sources – see Table 2.1